HUAWEI MC509 CDMA LGA Module

AT Command Interface Specification

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About This Document

History

Version	Date	Chapter	Descriptions
01	2011-08-26		Creation

Contents

1 Overall Description

This chapter briefly describes the contents and organization of this document and focuses on the basic knowledge of AT command interfaces.

1.1 Content Description

This document describes the AT command interface specification that is supported by Huawei terminal product MC509 module. This document describes certain AT commands (implemented by terminal devices) of international standards such as TIA/EIA/IS-707-A.3,GSM 07.07, GSM 07.05, and International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) V.250 [14] according to the requirements of terminal devices. In addition, this document describes the proprietary AT command interfaces that are implemented by terminal devices.

This document does not describe the interfaces that have been defined by standards or implemented by the mobile terminal (MT) but are not required by the MC509. The description of AT command interfaces covers only the data packets of interfaces and the methods and processes for the terminal equipment (TE) and the MT to use interfaces, excluding the contents that are not directly related to interfaces. In addition, this document describes only the AT command interfaces falling within the range of Rm interfaces between the TE and MT, excluding the AT command interfaces falling within the range of Um interfaces between the MT and interworking function (IWF).

1.2 Product Description

HUAWEI MC509 (the MC509) is a CDMA LGA module product, supporting two CDMA frequency bands, that is, CDMA800 and CDMA1900.

The MC509 provides one external UART interface and supports functions such as short message service (SMS), phone book, data service, and embedded TCP/UDP.

1.3 Instructions for Use

You are not advised to use various parameter values that are not described in this document or not supported currently as described in this document.

The AT command parameters described in the following chapters are in two formats: <> and [], which are described as follows:

<...>   The parameter inside these angle brackets is mandatory. The <> does not exist in a command.

[...]   The parameter inside these square brackets is optional. The [] does not exist in a command or a response.

<CR>   Carriage return character. For details, see the description in S3.

<LF>   Line feed character. For details, see the description in S4.

When an AT command is sent, the characters contained in the name and parameters (excluding SMSs, phone book, and operator name) of the AT command are case insensitive. All the characters contained in the result returned by the AT command must be in upper case (excluding SMSs, phone book, operator name and error messages).

When an AT command is sent, string parameters can be placed inside quotation marks or not.

1.4 Overview of AT Command Interfaces

1.4.1 Description of AT Commands

An AT command controls the rules for interaction between the TE such as PC and MT such as MS. Figure 1-1 shows the interaction between the TE and MT.

Figure 1-1 Interaction between the TE and MT

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Copyright © Huawei Technologies Co., Ltd.
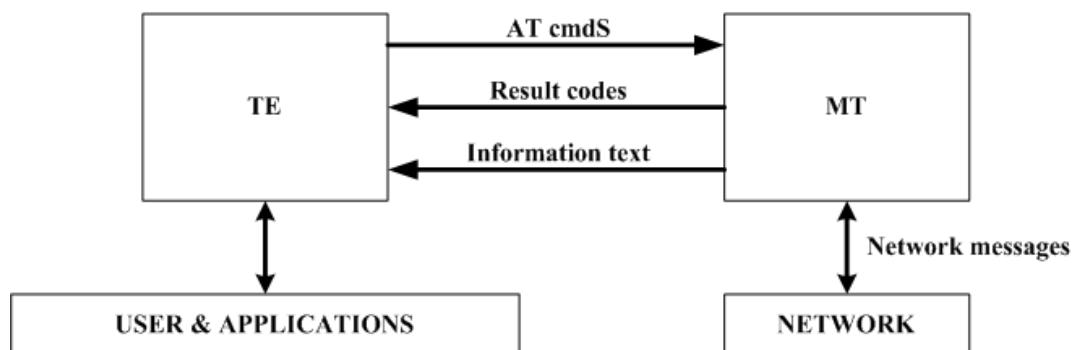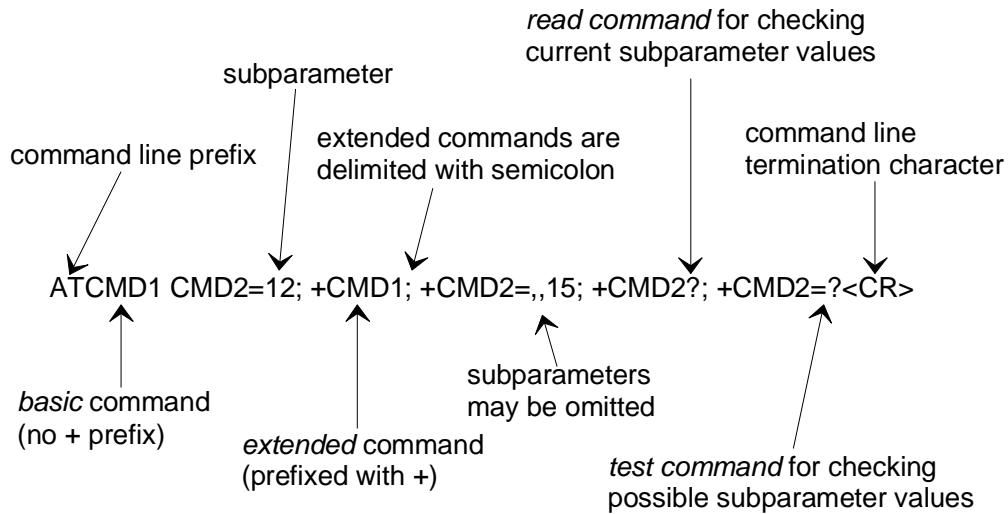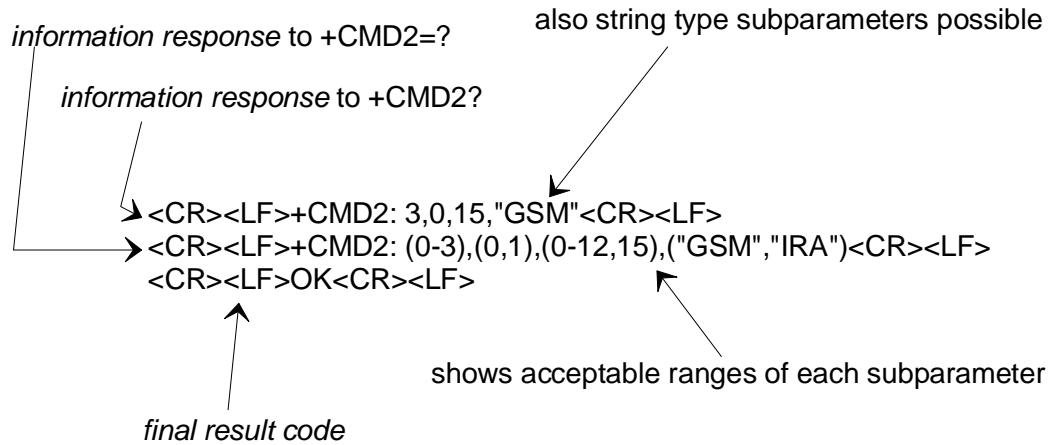
Figure 1-2 shows the basic organization format of the AT command line.

Figure 1-2 Basic organization format the AT command line

read command for checking
current subparameter values

subparameter

extended commands are
delimited with semicolon

command line prefix

command line
termination character

ATCMD1 CMD2=12; +CMD1; +CMD2=,,15; +CMD2?; +CMD2=?<CR>

basic command
(no + prefix)

extended command
(prefixed with +)

subparameters
may be omitted

test command for checking
possible subparameter values

The returned value of the AT command consists of two parts: response message and result codes. Figure 1-3 shows an example of returned value of the AT command.

Figure 1-3 An example of returned value of the AT command

information response to +CMD2=?

also string type subparameters possible

information response to +CMD2?

<CR><LF>+CMD2: 3,0,15,"GSM"<CR><LF>
<CR><LF>+CMD2: (0-3),(0,1),(0-12,15),("GSM","IRA")<CR><LF>
 <CR><LF>OK<CR><LF>

shows acceptable ranges of each subparameter

final result code

1.4.2 Types of AT Commands

AT commands are categorized into three types: basic commands, S register commands, and extended and vendor-defined commands.

A basic command starts with a single letter or with the & symbol plus a single letter. Table 1-1 describes the format of a basic command.

Table 1-1 Format of a basic command

Command Format	Description
<command>[<number>]	In the command format, **<command>** indicates a single letter (A–Z) or the & symbol plus a single letter.
	In the command format, **<number>** indicates a decimal number with one digit or multiple digits. The digit **0** at the start of **<number>** can be ignored.
Note: • If a basic command that is allowed to contain <number> does not contain <number>, the default value of <number> is used in the command. • If a basic command that is not allowed to contain <number> contains <number>, "ERROR" or "+CME ERROR : operation not allowed" is returned.	

An S register command consists of the letter S and a decimal number, which is called the parameter number of the register. An S register command can be in the format of read command and set command. Table 1-2 describes the format of an S register command.

Table 1-2 Format of an S register command

Command Format		Description
Read command	S<parameter number>?	Returns the ASCII code of characters currently saved in the S register. The ASCII code is expressed by a 3-digit decimal number. The digit **0** is added in the front of the number in case of insufficient digits.
Set command	S<parameter number>=<value>	Replaces the characters saved in the S register with the characters related to the value of **<value>**.
Note: If the parameter number of the register is not identified, this indicates that the command does not exist. In this case, ERROR is returned.		

All extended commands start with the + symbol. Vendor-defined commands start with a special symbol such as ^ and %. In this document, all vendor-defined commands start with the ^ symbol. Extended and vendor-defined commands are further categorized into action commands and parameter commands. Table 1-3 describes the types and formats of extended and vendor-defined commands.

An action command refers to a command that performs a specific action in addition to interacting with the local parameters of the MS, including **AT+CPBR** and **AT^HCMGS**. An action command may or may not contain parameters. Action commands are categorized into execution (write) command and test command. A parameter command refers to a command that interacts with the local parameters of the MT only, certain of which may affect the execution of action commands. Parameter commands are categorized into set command, read command, and test command.

Table 1-3 Types and formats of extended and vendor-defined commands

Command Type	Command Format		Description
Action command	Execution (write) command	Contains no parameter: <name> Contains one parameter: <name>[=<value>] Contains multiple parameters: <name>[=<compound_value>]	In the command format, **<compound_value>** indicates multiple parameters that are separated by a comma. A parameter having a default value can be omitted from the command. In this case, the default value is used instead.
		Note: If all parameters are omitted, the = symbol following **<name>** should be omitted. If **<name>** is not identified, this command does not exist. In this case, the ERROR is returned. When **<name>** is identified, if a command that is not allowed to contain parameters contains parameters or a command that is allowed to contain parameters contains more parameters than the defined ones, "ERROR" or "+CME ERROR: operation not allowed" is returned.	
	test command	<name>=?	A test command is executed to query the parameter range.
		Note: If the MS fails to identify **<name>**, the MT returns ERROR. If the MT can identify **<name>** and the contents returned by the command do not contain parameters, the MS returns OK. If the contents returned by the command contain parameters, the MS returns the available value range of each parameter, and then returns OK.	
Parameter command	Set command	Contains one parameter: <name>[=<value>] Contains multiple parameters: <name>[=<compound_value>]	A set command is executed to set parameters. In the command format, **<compound_value>** indicates multiple parameters that are separated by a comma. A parameter with a default value can be omitted from the command. In this case, the default value is used instead.

Command Type	Command Format		Description
	Note: If all parameters are omitted, the = symbol following **\<name\>** should be omitted. If **\<name\>** is not identified, this command does not exist. In this case, ERROR is returned. When **\<name\>** is identified, if a command that is not allowed to contain parameters contains parameters or a command that is allowed to contain parameters contains more parameters than the defined ones, "ERROR" or "+CME ERROR : operation not allowed" is returned.		
	Read command	\<name\>?	A read command is executed to read the current value of a parameter.
	test command	\<name\>=?	A test command is executed to check the parameter range.
	Note: If the MS fails to identify **\<name\>**, the MT returns ERROR. If the MT can identify **\<name\>** and the contents returned by the command do not contain parameters, the MS returns OK. If the contents returned by the command contain parameters, the MS returns the value range of each parameter, and then returns OK.		

1.4.3 Abort Attributes of AT Commands

Abort means that the TE sends an instruction to abort a command when the command is being executed. An abort instruction must be sent before a command is completely executed. Therefore, the abort instruction is valid for a command whose execution consumes certain time; however, not all commands of this kind can be aborted. Whether a command can be aborted depends on the abort attribute of the command. Each AT command has its abort attribute, which is alternative. That is, the command is either abortive or not abortive. Abortive commands include certain basic commands and execution commands of action commands. Within 125 ms after the abortive commands are sent, no abort request is accepted. After 125 ms and before the commands are completely executed, if the module receives any character sent by the TE, the commands are aborted immediately.

1.4.4 Rules for Running AT Commands

1. Each command line contains only one AT command and ends with a carriage return character, in addition to the basic standard commands such as 1, V, S3 etc. In principle, users are not allowed to run S3/S4 format modification commands. This rule is applicable to the communication between the MT and TE programs.

2. To increase the readability and regularity of command and response formats, in addition to the original interfaces specified in standards and protocols, all new interfaces must observe the following rule: No space is added to the end of commands such as the **AT^XXX**=**\<arg0\>**,**\<arg1\>** commands, or added to the end of the ^ symbol, colon, and comma. No redundant space is added ahead of

or to the end of a command. This rule is applicable to the communication between the MT and TE programs.

3. For an uninterruptible AT command, after sending the AT command, the TE must wait until the MT responds to the AT command before sending the second AT command.

4. A string used by the TE to send a command cannot contain the combination of quotation marks and commas (confusing a parameter with a string). The current version does not support escape character. The code value of a data format in the UCS2 encoding is reported as characters. For example, if the UCS2 code of a Chinese character is 0x553a, the 553a is reported.

A possible response sent by the MT to the TE consists of **Information text** and **Result code**, in which **Information text** is optional and **Result code** is mandatory. The format of a possible response is controlled by the ATV command. For details, see the description of the ATV Command. In this document, all possible responses listed in tables follow the ATV1 format.

1.5 Organization of This Document

This document consists of 15 chapters, covering the following contents:

Chapter	Description
Chapter 1 Overall Description	The contents and organization of this document and the basic knowledge of AT command interfaces.
Chapter 2 Basic Configuration Commands	The AT commands used to configure the basic data of the module.
Chapter 3 Identity Information Query Commands	The AT commands used to query the identity information.
Chapter 4 Security Control Commands	The AT commands used to control the security of the module.
Chapter 5 Serial Port Control Commands	The AT commands used to control the serial ports of the module.
Chapter 6 Network Service Interface Commands	The AT commands related to the network services of the module.
Chapter 7 Call Control Commands	The AT commands used to control the calls on the module.
Chapter 8 SMS Interface Commands	The AT commands related to the short messages of the module.
Chapter 9 Phonebook Interface Commands	The AT commands related to the phonebook interface of the module.
Chapter 10 Internet Service Interface Commands	The AT commands related to the internet services of the module.

Chapter	Description
Chapter 11 Audio Commands	The AT commands related to the audio interface of the module.
Chapter 12 Wakeup Commands	The AT commands related to wakeup interface of the module.
Chapter 13 SAR Commands	The AT commands related to control the SAR of the module.
Chapter14 GPS Commands	The AT commands related to the GPS of the module.
Chapter 15 Appendix	Appendix

2 Basic Configuration Commands

2.1 E – Echo Command

2.1.1 Syntax

Command	Possible Response(s)
E[<value>]	<CR><LF>OK<CR><LF>

2.1.2 Interface Description

This command sets whether the MT echoes the characters received from the TE.

📖 **NOTE**

The dial-up network, especially the automatic processing software automatically sends the **ATE0** command to disable the echo mode, thus shortening the time for the client to parse the **AT** command.

2.1.3 Parameter Description

<value>:

0: The MT does not echo the characters received from the TE.

1: The MT echoes the characters received from the TE (default value after startup).

In case of using the command without **<value>**, **<value>** is set to **1**.

📖 **NOTE**

After restart, **<value>** is set to **1**.

2.2 S3 – Command Line Termination Character

2.2.1 Syntax

Command	Possible Response(s)
S3=<value>	<CR><LF>OK<CR><LF>
S3?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

2.2.2 Interface Description

This command sets the command line termination character S3. S3 saves the command line termination character in the ASCII code format. The character is sent by the TE to indicate the termination of a command line, which is identified and confirmed by the MT. The character is also sent by the MT to compose the headers, tails, and end flags of the result code and response information.

When running **S3=<value>** to set S3, use the current S3 as the termination character. The new S3 will be immediately returned with the result code.

2.2.3 Parameter Description

<value>: A decimal number ranges from 000 to 127, indicating the ASCII code of the character. The default value is **013**.

📖 **NOTE**

ATS3=1 is equivalent to **ATS3=001**.

2.3 S4 – Response Format Character

2.3.1 Syntax

Command	Possible Response(s)
S4=<value>	<CR><LF>OK<CR><LF>
S4?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

2.3.2 Interface Description

This command sets the response format character S4. S4 saves the response format character in the ASCII code format. The character is sent by the MT to compose the headers, tails, and end flags of the result code and response information.

If the S4 character is changed by the command, the new S4 will be immediately returned with the result code of the command.

2.3.3 Parameter Description

<value>: A decimal number ranges from 000 to 127, indicating the ASCII code of the character. The default value is **010**.

📖 **NOTE**

ATS4=1 is equivalent to **ATS4=001**.

2.4 S5 – Backspace Character

2.4.1 Syntax

Command	Possible Response(s)
S5=<value>	<CR><LF>OK<CR><LF>
S5?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

2.4.2 Interface Description

This command sets the backspace character S5. S5 saves the backspace character in the ASCII code format. The character is sent by the TE as a request to delete the previous character and is identified and confirmed by the MT.

2.4.3 Parameter Description

<value>: A decimal number ranges from 000 to 127, indicating the ASCII code of the character. The default value is **008**.

📖 **NOTE**

ATS5=1 is equivalent to **ATS5=001**.

2.5 V－Command for Setting the Response Format

2.5.1 Syntax

Command	Possible Response(s)
V[<value>]	<CR><LF>OK<CR><LF>

2.5.2 Interface Description

This command sets the format of the result code and information field in response to an AT command, including the composition of the header and the tail and the form of the returned result code content. The retuned result code content has two formats, namely, digit, and detailed string.

The following table describes the impact of the format setting on the format of the result code and the response information field. <CR> indicates the S3 character and <LF> indicates the S4 character.

	V0	V1
Response information field	<text><CR><LF>	<CR><LF> <text><CR><LF>
Result code	<numeric code><CR>	<CR><LF> <verbose code><CR><LF>

The following table describes the format comparison of the returned result code content.

String Format(V1)	Digit Format (V0)	Meaning
OK	0	The command is successfully executed.
CONNECT	1	The connection is successfully established.
RING	2	The MT rings.
NO CARRIER	3	The connection fails to be established or the MT hangs up.
ERROR	4	The command is unavailable or the line of commands is too long; therefore, an error is returned.
NO DIALTONE	6	There is no dialing tone.
BUSY	7	The called subscriber is busy.
NO ANSWER	8	There is no answer.

2.5.3 Parameter Description

<value>:

0: The MT sends an abbreviated header and tail and adopts the result code in the digit format.

1: The MT sends a complete header and tail and adopts the result code in the detailed string format (default value after startup).

In case of using the command without **<value>**, **<value>** is set to **0**.

2.6 Q – Command for Controlling Return of the Execution Result

2.6.1 Syntax

Command	Possible Response(s)
Q[<value>]	<CR><LF>OK<CR><LF>

2.6.2 Interface Description

This command sets whether the MT returns the execution result to the TE.

2.6.3 Parameter Description

<value>:

0: The MT returns the execution result (default value after startup).

1: The MT does not return the execution result.

In case of using the command without **<value>**, **<value>** is set to **0**.

2.7 &F – Command for Restoring Factory Settings

2.7.1 Syntax

Command	Possible Response(s)
&F	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

2.7.2 Interface Description

This command sets the related parameters to the default values set by the manufacturer.

The following parameters can be specified by running this command:

Command	Parameter
E	1
V	1
Q	0
&C	1
&D	2
&S	0
S0	0
S3	13
S4	10
S5	8
+IFC	0,0
+ICF	3,3
+CNMI	1,1,0,2,0
+CPMS	"ME","ME","ME"
+CMEE	2

2.8 &V – Command for Querying the Current Configuration

2.8.1 Syntax

Command	Possible Response(s)
&V	<CR><LF>Parameter list<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

2.8.2 Interface Description

This command queries the values of currently configured parameters.

The following parameters can be queried by running this command:

Command	Parameter
E	<value>
V	<value>
Q	<value>
&C	<value>
&D	<value>
&S	<value>
S0	<value>
S3	<value>
S4	<value>
S5	<value>
+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>
+IPR	<rate>
+CMEE	<n>
+CREG	<n>

2.9 A/－ Command for Repeating the Previous Command

2.9.1 Syntax

Command	Possible Response(s)
A/	

2.9.2 Interface Description

This command repeats the previous **AT** command. This command does not require the user to press **Enter**.

2.9.3 Example

If the last command is:

AT+CGSN

81042940

OK

A/

81042940

OK

2.10 +CMEE – Command for Setting the Error Report Format

2.10.1 Syntax

Command	Possible Response(s)
+CMEE=<n>	<CR><LF>OK<CR><LF>
+CMEE?	<CR><LF>+CMEE:<n><CR><LF> <CR><LF>OK<CR><LF>
+CMEE=?	<CR><LF>+CMEE:(supported <n> list) <CR><LF> <CR><LF>OK<CR><LF>

2.10.2 Interface Description

This command sets whether the returned value uses "+CME ERROR:<err>" to indicate an error related to the MT. If the returned value uses "+CME ERROR:<err>" to indicate an error related to the MT, the error related to the MT generates "+CME ERROR:<err>" to replace "ERROR". When the error cause is unrelated to the MT, "ERROR" is returned.

2.10.3 Parameter Description

<n>:

0: The returned value of "+CME ERROR:<err>" is not used, and only "ERROR" is returned in the case of an error.

1: The returned value of "+CME ERROR:<err>" is used, and **<err>** uses the number value of the error.

2: The returned value of "+CME ERROR:<err>" is used, and **<err>** uses the detailed string value of the error (default value after startup).

After restart, the value of **<n>** is **2**.

<err>: For its value, see section 15.1 "CME ERROR List."

2.11 +CFUN－Command for Setting the Operating Mode

2.11.1 Syntax

Command	Possible Response(s)
+CFUN[=<fun>[,<rst>]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CFUN?	<CR><LF>+CFUN:<fun><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CFUN=?	<CR><LF>+CFUN:(supported <fun> list),(supported <rst> list)<CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

2.11.2 Interface Description

The execution command sets the operating mode of the MT.

The current operating mode is returned when the read command is executed.

The supported parameter value is returned when the test command is executed.

2.11.3 Parameter Description

<fun>:

0: The operating mode is set to the low power consumption (LPM) mode (the previous operating mode of the MT must be the non-offline mode).

1: The operating mode is set to the online mode (the previous operating mode of the MT must be the non-offline mode) (default value after startup).

4: The operating mode is set to the offline mode (the previous operating mode of the MT must be the non-FTM mode)

5: The operating mode is set to the FTM mode (the previous operating mode of the MT must be the online mode)

6: reset the MT (the previous operating mode of the MT must be the offline mode)

<rst>: Specifies whether the MT is restarted before the mode is set (reserved and not supported at present).

> 📖 **NOTE**
>
> If the **AT+CFUN** command is executed without parameters, the operating mode is set to the LPM mode.

2.12 ^VOLT – Command for Querying the voltage

2.12.1 Syntax

Command	Possible Response(s)
^VOLT	<CR><LF>^VOLT:<voltage><CR><LF><CR><LF> OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

2.12.2 Interface Description

This command queries the current voltage.

2.12.3 Parameter Description

<voltage>: Units of mV

2.13 ^RESET - Command for Delaying the Module Reset Function

2.13.1 Syntax

Command	Possible Response(s)
^RESET[=<delay_time>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^RESET?	In case of successful execution: <CR><LF>^RESET:<delay_time><CR><LF> <CR><LF>OK<CR><LF>

2.13.2 Interface Description

This command restarts the MT.

2.13.3 Parameter Description

<delay_time>: Delay time.

0　　　　　Disable the function of this command.

1~65535　Delay time, indicates in second.

📖 **NOTE**

AT^RESET without a parameter is equivalent to AT^RESET=0.

2.14 ^MSO – Shutdown Command

2.14.1 Syntax

Command	Possible Response(s)
^MSO	<CR><LF>OK<CR><LF>

2.14.2 Interface Description

This command powers off the MT. When the command is executed, the MT logs out of the network, saves subscriber data, and then shut down.

2.15 ^HS – Command for Shaking Hands with the TE

2.15.1 Syntax

Command	Possible Response(s)
^HS=<id>,<action>	<CR><LF>^HS:<id>,<protocol>,<is_offline>,<product_class>,<product_id>[,<software_id>] <CR><LF><CR><LF>OK<CR><LF>

2.15.2 Interface Description

This command initiates a handshake between the TE and the MT.

2.15.3 Parameter Description

<id>: Consists of eight hex digits. It indicates the ID reported by the MT for identifying the MT. When the TE sends this command for the first time, **id** is set to **0**, and then **id** is set to the value reported by the MT.

<action>: Specifies the action type of the TE.

0: The TE is active. (If the TE sends this command for the first time, it indicates startup.)

1: The TE is stopped.

<protocol>: Specifies the current communication protocol status of the MT.

0: The MT runs in the APP state.

<is_offline>:

0: online state

1: offline state (reserved and not supported at present)

2: LPM

<product_class>: Specifies the product type

2: Code division multiple access (CDMA) 1X + EVDO

<product_id>: Specifies the product ID

3: MC509

<software_id>: Reserved and not supported at present.

2.15.4 Example

AT^HS=0,0

^HS:494BBC7E,0,0,2,3

OK

3 Identity Information Query Commands

3.1 I – Command for Querying Product Identity Information

3.1.1 Syntax

Command	Possible Response(s)
I[<value>]	<CR><LF><module info><CR><LF> <CR><LF>OK<CR><LF>

3.1.2 Interface Description

This command queries identity information related to the MT, including manufacturer information (+GMI), product model (+GMM), software version (+GMR), and electronic serial number (ESN)/international mobile equipment identity (IMEI) (+GSN).

3.1.3 Parameter Description

<value>:

0: The preceding identity information is queried.

In case of using the command without **<value>**, **<value>** is set to **0**.

3.1.4 Example

ATI

Manufacturer: +GMI: HUAWEI TECHNOLOGIES CO., LTD

Model: MC509

Revision: 11.106.02.00.000

ESN: +GSN:80761abd

+GCAP: +CIS707-A,CIS-856-A,+MS, +ES, +DS, +FCLASS

OK

3.2 +CGMI/+GMI – Command for Querying Manufacturer Information

3.2.1 Syntax

Command	Possible Response(s)
+CGMI or +GMI	<CR><LF><manufacturer><CR><LF> <CR><LF>OK<CR><LF>
+CGMI=? or +GMI=?	<CR><LF>OK<CR><LF>

3.2.2 Interface Description

This command queries manufacturer information.

3.2.3 Parameter Description

<manufacturer>: A string without double quotation marks, indicating the manufacturer information.

3.2.4 Example

AT+CGMI

Huawei Technologies Co., Ltd.

OK

3.3 +CGMM/+GMM – Command for Querying Product Name

3.3.1 Syntax

Command	Possible Response(s)
+CGMM or +GMM	\<CR>\<LF>\<production_ name>\<CR>\<LF> \<CR>\<LF>OK\<CR>\<LF>
+CGMM=? or +GMM=?	\<CR>\<LF>OK\<CR>\<LF>

3.3.2 Interface Description

This command queries product name information. The product name information can be presented in one or more lines of text, depending on the manufacturer. It is used to identifying the equipment model and may include the product name and any information provided by the manufacturer. The number of returned characters (including the termination character '\0') cannot exceed 2048.

3.3.3 Parameter Description

\<production_name>: A string without double quotation marks, indicating the product name.

3.3.4 Example

AT+CGMM

MC509

OK

3.4 +CGMR/+GMR – Command for Querying the Software Version

3.4.1 Syntax

Command	Possible Response(s)
+CGMR or +GMR	\<CR>\<LF>\<softversion>\<CR>\<LF> \<CR>\<LF>OK\<CR>\<LF>
+CGMR=? or +GMR=?	\<CR>\<LF>OK\<CR>\<LF>

3.4.2 Interface Description

This command queries the software version of the MT.

3.4.3 Parameter Description

<softversion>: Indicates the software version. It is a string without double quotation marks, consisting of 31 characters at most.

3.4.4 Example

AT+CGMR

11.105.01.00.000

OK

3.5 +GSN – Command for Querying the ESN

3.5.1 Syntax

Command	Possible Response(s)
+GSN	<CR><LF>+GSN:<ESN><CR><LF> <CR><LF>OK<CR><LF>
+GSN=?	<CR><LF>OK<CR><LF>

3.5.2 Interface Description

This command queries the ESN of the MT.

📖 **NOTE**

If the removable user identify module (R-UIM) card is inserted, and the personal identification number (PIN) of the R-UIM card is successfully unlocked, the ESN of the R-UIM card is returned.

3.5.3 Parameter Description

<ESN>: Indicates the ESN. It is a string without double quotation marks, consisting of eight hex digits.

3.5.4 Example

AT+GSN

+GSN:80469bb7

OK

3.6 +CGSN – Command for Querying the ESN

3.6.1 Syntax

Command	Possible Response(s)
+CGSN	<CR><LF><ESN><CR><LF> <CR><LF>OK<CR><LF>
+CGSN=?	<CR><LF>OK<CR><LF>

3.6.2 Interface Description

This command queries the ESN of the MT.

📖 NOTE

If the removable user identify module (R-UIM) card is inserted, and the personal identification number (PIN) of the R-UIM card is successfully unlocked, the ESN of the R-UIM card is returned.

3.6.3 Parameter Description

<ESN>: Indicates the ESN. It is a string without double quotation marks, consisting of eight hex digits.

3.6.4 Example

AT+CGSN

80469bb7

OK

3.7 ^HWVER – Command for Querying the Hardware Version

3.7.1 Syntax

Command	Possible Response(s)
^HWVER	<CR><LF>^HWVER:<hardversion><CR><LF> <CR><LF>OK<CR><LF>

3.7.2 Interface Description

This command queries the hardware version of the MT.

3.7.3 Parameter Description

<hardversion>: Indicates the hardware version. It is a string without double quotation marks, consisting of 30 characters at most.

3.8 ^MEID – Command for Querying the MEID

3.8.1 Syntax

Command	Possible Response(s)
^MEID	<CR><LF> ^MEID:<meid><CR><LF> <CR><LF>OK<CR><LF>
^MEID=?	<CR><LF>OK<CR><LF>

3.8.2 Interface Description

This command queries the mobile equipment identifier (MEID) of the R-UIM card. If the R-UIM card is unavailable, the MEID of the MT is returned.

3.8.3 Parameter Description

<meid>: A string without double quotation marks, consisting of 14 hex digits. If the MEID does not exist, "00000000000000" is displayed.

3.8.4 Example

AT^MEID

^MEID:A0C72311111111

OK

3.9 +CIMI – Command for Querying the IMSI

3.9.1 Syntax

Command	Possible Response(s)
+CIMI	<CR><LF><IMSI><CR><LF> <CR><LF>OK<CR><LF>
+CIMI=?	<CR><LF>OK<CR><LF>

3.9.2 Interface Description

This command queries the IMSI of the R-UIM card. If the R-UIM card is unavailable, the IMSI of the MT is returned.

3.9.3 Parameter Description

<IMSI>: A string consisting of decimal digits 0–9. Its structure is as follows:

There are a maximum of 15 characters.		
3 chars	2 or 3 chars	
MCC	MNC	MSIN

MCC: mobile country code

MNC: mobile network code

MSIN: mobile subscriber identification number

3.10 ^ICCID – Command for Querying the ICCID

3.10.1 Syntax

Command	Possible Response(s)
^ICCID？	<CR><LF>^ICCID:<uim_iccid><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^ICCID=?	<CR><LF>OK<CR><LF>

3.10.2 Interface Description

This command queries the integrated circuit card identity (ICCID) of the R-UIM card.

> **NOTE**
> The ICCID can also be queried when the R-UIM card is locked. If no R-UIM card is available, "+CME ERROR:R-UIM not inserted" is returned.

3.10.3 Parameter Description

<uim_iccid>: A string without double quotation marks, consisting of 20 hex digits.

3.10.4 Example

AT^ICCID？

^ICCID:89860309907552584689

OK

3.11 ^MDN – Command for Querying the MDN

3.11.1 Syntax

Command	Possible Response(s)
^MDN	<CR><LF>^MDN:<MDN_num><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^MDN=?	<CR><LF>OK<CR><LF>

3.11.2 Interface Description

This command queries the mobile directory number (MDN) of the R-UIM card. If no R-UIM card is available, the MDN of the MT is returned.

3.11.3 Parameter Description

<MDN_num>: A string without double quotation marks, consisting of a maximum of 15 decimal digits.

3.11.4 Example

AT^MDN

^MDN:8613312121001

OK

4 Security Control Commands

4.1 +CLCK – Command for Enabling the PIN and Querying the Status

4.1.1 Syntax

Command	Possible Response(s)
+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	When <mode>=2 and the command is successfully executed: <CR><LF>+CLCK:<status><CR><LF> <CR><LF>OK<CR><LF> When <mode>≠2 and the command is successfully executed: <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CLCK=?	<CR><LF>+CLCK:(supported <fac> list)<CR><LF> <CR><LF>OK<CR><LF>

4.1.2 Interface Description

The execution command locks or unlocks the R-UIM card and query the locking status.

The test command queries the equipment supported by this command.

4.1.3 Parameter Description

<fac>: Specifies the equipment on which this command is executed.

"SC": R-UIM card

<mode>: Specifies the operation mode. The values are as follows:

0: unlocking

1: locking

2: status query

<status>:

0: deactivated

1: activated

<passwd>: A string with double quotation marks. It should be the same as the password set by running the **+CPWD** command. This item is mandatory when **mode** is set to **0** or **1**. The parameter value must be a string consisting of digits 0–9. Otherwise, "ERROR" is returned.

<class>: Reserved and not supported at present

4.2 +CPIN – PIN Management Command

4.2.1 Syntax

Command	Possible Response(s)
+CPIN=<pin>[,<newpin>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CPIN?	<CR><LF>+CPIN:<code><CR><LF> <CR><LF>OK<CR><LF>
+CPIN=?	<CR><LF>OK<CR><LF>

4.2.2 Interface Description

The execution command verifies and unlocks the PIN and PIN2 codes.

If PIN or PIN2 is requested, run **+CPIN=<pin>** for verification.

If PUK or PUK2 is requested, run **+CPIN=<pin>,<newpin>** for unlocking. The first parameter is **R-UIM PUK** or **R-UIM PUK2**. The second parameter is the new PIN or PIN2 code.

If the PIN is not requested and the execution command is run, the error information **+CME ERROR** is returned.

📖 **NOTE**

- If an emergency call is being originated, the emergency call may be disconnected when the PIN or PUK code is verified.

- Operation on PIN2 and PUK2 is not supported at present.

- The read command queries whether the password is requested.

4.2.3 Parameter Description

<pin>, <newpin>: Strings with double quotation marks. The string consists of digits 0–9 only. Otherwise, "ERROR" is returned.

<code>: string (without quotation marks)

READY: The MT does not have a password entry request.

R-UIM PIN: UICC/R-UIM PIN password request

R-UIM PUK: UICC/R-UIM PUK password request, and used to unlock the locked PIN code

R-UIM PIN2: PIN2 password request (not supported at present)

R-UIM PUK2: PUK2 password request, and used to unlock the locked PIN2 code (not supported at present)

4.3 ^CPIN – PIN Extension Management Command

4.3.1 Syntax

Command	Possible Response(s)
^CPIN=<pin>[,<newpin>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^CPIN?	<CR><LF>^CPIN:<code>,[<times>],<puk_times>,<pin_times> [,<puk2_times>,<pin2_times>]<CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^CPIN=?	<CR><LF>OK<CR><LF>

4.3.2 Interface Description

The execution command verifies and unlocks the PIN and PIN2 codes.

If PIN or PIN2 is requested, run ^CPIN=<pin> for verification.

If PUK or PUK2 is requested, run **^CPIN=<pin>,<newpin>** for unlocking. The first parameter is **R-UIM PUK** or **R-UIM PUK2**. The second parameter is the new PIN or PIN2 code.

If the PIN is not requested and the execution command is run, the error information **+CME ERROR** is returned.

 NOTE

- If an emergency call is being originated, the emergency call may be disconnected when the **PIN** or **PUK** code is verified.
- Operation on **PIN2** and **PUK2** is not supported at present.
- The read command queries whether the password is requested. The remaining number of password entry attempts is provided.

4.3.3 Parameter Description

<pin>, <newpin>: strings with double quotation marks. The characters in the string contain only 0–9. Otherwise, "ERROR" is returned.

<code>: string (without quotation marks)

READY: The MT does not have a password entry request.

R-UIM PIN: UICC/R-UIM PIN password request

R-UIM PUK: UICC/R-UIM PUK password request, and used to unlock the locked PIN code

R-UIM PIN2: PIN2 password request (not supported at present)

R-UIM PUK2: PUK2 password request, and used to unlock the locked PIN2 code (not supported at present)

<times>: Specifies the remaining number of entry attempts. For the PIN and PIN2 codes, the maximum number of entry attempts is 3. For the PUK and PUK codes, the maximum number of entry attempts is 10.

 NOTE

- If the password is requested, the **<times>** field specifies the remaining number of entry attempts. If the password is not requested, this field is null.
- The **PIN2** and **PUK2** codes are not supported at present. Therefore, the remaining number of entry attempts for them is not displayed.

<puk_times>: Specifies the remaining number of PUK entry attempts, and the maximum number of entry attempts is 10.

<pin_times>: Specifies the remaining number of PIN entry attempts, and the maximum number of entry attempts is 3.

<puk2_times>: Specifies the remaining number of PUK2 entry attempts, and the maximum number of entry attempts is 10 (not supported at present).

<pin2_times>: Specifies the remaining number of PIN2 entry attempts, and the maximum number of entry attempts is 3 (not supported at present).

4.4 +CPWD – Command for Changing the Password

4.4.1 Syntax

Command	Possible Response(s)
+CPWD=<fac>,<oldpwd>, <newpwd>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CPWD=?	<CR><LF>+CPWD:supported (<fac>,<pwdlength>) list <CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

4.4.2 Interface Description

The execution command changes the PIN and PIN2 codes of the equipment.

The test command queries the supported equipment and the maximum length of the equipment password.

📖 **NOTE**

The password can be changed only when the **PIN** is enabled (that is, **1** is returned when the **+CLCK** command is executed for query).

4.4.3 Parameter Description

<fac>: A string with double quotation marks. **<fac>** specifies the equipment (only the R-UIM card is supported, with the value of **SC**) operated by this command.

"SC": Specifies the PIN code of the R-UIM card.

"P2"   : Specifies the PIN2 code of the R-UIM card (reserved and not supported at present).

<oldpwd>,<newpwd>: A string with double quotation marks, specifying the old password and new password. The maximum length is specified by **<pwdlength>**. The string consists of digits 0–9 only. Otherwise, "ERROR" is returned.

<pwdlength>: Specifies the maximum length of the password of the equipment lock.

4.4.4 Example

AT+CLCK="SC",2

+CLCK:1

OK

AT+CPWD="SC","1111","2222"

OK

5 Serial Port Control Commands

5.1 &C – Command for Setting the Changing Mode of DCD Signals

5.1.1 Syntax

Command	Possible Response(s)
&C[<value>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

5.1.2 Interface Description

This command sets the changing mode of DCD signals.

5.1.3 Parameter Description

<value>:

0: DCD signals are always ON.

1: DCD signals are ON when there is a data carrier (default value after startup).

 NOTE

In case of using the command without **<value>**, **<value>** is set to **0**.

5.2 &D – Command for Setting the MT Action in Response to the DTR Signals

5.2.1 Syntax

Command	Possible Response(s)
&D[<value>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

5.2.2 Interface Description

This command sets the MT action when data terminal ready (DTR) signals change from ON to OFF.

5.2.3 Parameter Description

<value>:

0: The MT ignores the DTR status.

1: When DTR signals changes from ON to OFF, the MT switches to the command mode and maintains the current conversation (reserved and not supported at present).

2: When DTR signals changes from ON to OFF, the MT switches to the command mode and interrupts the current data conversation (CSD, packet-switched (PS) data service); when DTR=OFF, automatic answer is disabled (default value after startup).

📖 **NOTE**

In case of using the command without **<value>**, **<value>** is set to **0**.

5.3 &S – Command for Setting the Changing Mode of DSR Signals

5.3.1 Syntax

Command	Possible Response(s)
&S[<value>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

5.3.2 Interface Description

This command sets the changing mode of DSR signals.

5.3.3 Parameter Description

<value>:

0: DSR signals are always ON (default value after startup).

1: DSR signals are ON after the connection is established (reserved and not supported at present).

📖 **NOTE**

In case of using the command without **<value>**, **<value>** is set to **0**.

5.4 +ICF – Command for Setting the Character Frame Format

5.4.1 Syntax

Command	Possible Response(s)
+ICF[=<format>[,<parity>]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
+ICF?	<CR><LF>+ICF:<format>[,<parity>]<CR><LF> <CR><LF>OK<CR><LF>
+ICF=?	<CR><LF>+ICF:(supported <format> list),(supported <parity> list) <CR><LF> <CR><LF>OK<CR><LF>

5.4.2 Interface Description

This command sets the start and end (asynchronous) frame format of the current physical serial port on the MT. This format is used when the MT receives the command, information, and result code from the TE.

At present, only "AT+ICF=3,3" is supported.

5.4.3 Parameter Description

<format>:

3: Eight data bits and one stop bit (default value after startup)

<parity>:

0: odd parity (reserved and not supported at present)

1: even parity (reserved and not supported at present)

2: MARK (reserved and not supported at present)

3: SPACE (default value after startup)

📖 **NOTE**

- **AT+ICF** is equivalent to **AT+IFC=3,3**.
- When the check bit of the physical serial port on the TE is set to **None** or **Space**, the TE can properly communicate with the MT.

5.5 +IPR – Command for Setting the Fixed Baud Rate

5.5.1 Syntax

Command	Possible Response(s)
+IPR[=<rate>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
+IPR?	<CR><LF>+IPR:<rate><CR><LF> <CR><LF>OK<CR><LF>
+IPR=?	<CR><LF>+IPR:(supported automatic detection baud rate list),(supported <rate> list) <CR><LF> <CR><LF>OK<CR><LF>

5.5.2 Interface Description

This command sets the baud rate of the current physical serial port on the MT. The default value upon startup is **115200**.

📖 NOTE
- Automatic detection of the baud rate is not supported at present. Therefore, the first returned parameter list is blank when the test command is executed. For example: +IPR:(),(300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400)
- If the physical serial port baud rate is higher than the radio bearer rate, data may be lost when being transmitted.
- After the baud rate is changed, wait for a period of time (for example, 100 ms) before continuing the communication.

5.5.3 Parameter Description

<rate>: Specifies the baud rate. It is a decimal integer. The values are as follows:

300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400

📖 NOTE
AT+IPR without a parameter is equivalent to **AT+IPR=115200**.

5.6 +IFC – Command for Setting Flow Control

5.6.1 Syntax

Command	Possible Response(s)
+IFC[=<DCE_by_DTE> [,<DTE_by_DCE>]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
+IFC?	<CR><LF>+IFC:<DCE_by_DTE>,<DTE_by_DCE><CR><LF> <CR><LF>OK<CR><LF>
+IFC=?	<CR><LF>+IFC:(supported <DCE_by_DTE> list), (supported <DTE_by_DCE> list)<CR><LF> <CR><LF>OK<CR><LF>

5.6.2 Interface Description

This command sets and queries bidirectional flow control.

5.6.3 Parameter Description

<DCE_by_DTE>:

0: none (default value after startup)

1: software flow control (XON/XOFF) (not supported at present)

2: Request to send (RTS) signal

3: XON/XOFF, and the XON/XOFF is sent to the remote TS to supplement local flow control (not supported at present)

<DTE_by_DCE>:

0: none (default value after startup)

1: XON/XOFF (not supported at present)

2: Clear to send (CTS) signal

📖 **NOTE**

AT+IFC is equivalent to AT+IFC=0,0.

6 Network Service Interface Commands

6.1 ^SIMST–change of uim state instructions

6.1.1 Syntax

Command	Possible Response(s)
	<CR><LF>^ SIMST:< *sim_state* ><CR><LF>

6.1.2 Interface Description

When the uim state changes, the MT automatically reports the new state to the TE.

6.1.3 Parameter Description

<sim_state>: UIM card state

1: uim card status is valid

240: ROMSIM version

255:uim card not exist

6.2 ^SYSINFO – Command for Querying System Information

6.2.1 Syntax

Command	Possible Response(s)
^SYSINFO	<CR><LF>^SYSINFO:<srv_status>,<srv_domain>,<roam_status>, <sys_mode>,<sim_state>[,<lock_state>,<sys_submode>]<CR><LF> <CR><LF>OK<CR><LF>

6.2.2 Interface Description

This command queries the current system information, such as the system service state, domain, whether to roam, system mode, and state of the R-UIM card.

6.2.3 Parameter Description

<srv_status>: Indicates the system service state. The values are as follows:

0: no service

1: restricted service (not supported by this product)

2: valid service

3: restricted regional service (not supported by this product)

4: power-saving and deep sleep state

<srv_domain>: Indicates the service domain of the system. The values are as follows:

0: no service domain

1: only CS service

2: only PS service

3: PS+CS service

4: CS and PS are not registered, searching

255: This fixed value is always returned because the product does not support this parameter.

<roam_status>: Indicates the roaming state. The values are as follows:

0: non-roaming state

1: roaming state

<sys_mode>: Indicates the system mode. The values are as follows:

0: no service

2: CDMA mode

4:HDR mode

6:GPS mode

8:CDMA/HDR HYBRID

<sim_state>: Indicates the state of the R-UIM card. The values are as follows:

0: The state of the R-UIM card is invalid or the PIN code is locked.

1: The state of the R-UIM card is valid.

240: ROMSIM version

255: The R-UIM card does not exist.

<lock_state>: Not supported at present.

<sys_submode>:

0:NOSRV

10:REV0

11:REVA

13:1XRTT

6.3 ^DSDORMANT – Instructions into the dormant

6.3.1 Syntax

Command	Possible Response(s)
	<CR><LF>^ DSDORMANT:< *dormant_state* ><CR><LF>

6.3.2 Interface Description

Data service connection, in the time data is not up or down no data transmission initiated by the network to the dormant.

6.3.3 Parameter Description

<dormant_state>: dormant state

0:not dormant state

1: dormant state

2-255: Reservations

6.4 ^MODE – Command for Indicating the System Mode Change

6.4.1 Syntax

Command	Possible Response(s)
	<CR><LF>^MODE:<sys_mode>[,<sys_submode>]<CR><LF>

6.4.2 Interface Description

When the system mode changes, the MT automatically reports the change to the TE.

6.4.3 Parameter Description

<sys_mode>: Indicates the system mode. The values are as follows:

0: no service

2: CDMA mode

4:HDR mode

6:GPS mode

8:CDMA/HDR HYBRID

<sys_submode>: Indicates the system sub-mode. This parameter is not used in the product.

6.5 ^PREFMODE – Command for setting the network mode

6.5.1 Syntax

Command	Possible Response(s)
^PREFMODE=<pref_mode>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^PREFMODE?	<CR><LF>^PREFMODE:<pref_mode><CR><LF> <CR><LF>OK<CR><LF>
^PREFMODE=?	<CR><LF>^ PREFMODE: (range of supported < pref_mode >s)<CR><LF>OK<CR><LF>

6.5.2 Interface Description

This command forced to set priorities network mode for the user.

6.5.3 Parameter Description

< pref_mode >:

2: CDMA mode

4: HDR mode

8: CDMA/HDR HYBRID mode

6.6 ^rfswitch – Command for Setting the Flight Mode

6.6.1 Syntax

Command	Possible Response(s)
^RFSWITCH [=<SW state>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^ RFSWITCH?	<CR><LF>^ RFSWITCH:<SW state>,<HW state><CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^ RFSWITCH =?	<CR><LF>^ RFSWITCH: (0-1),(0-1)<CR><LF><CR><LF>OK<CR><LF>

6.6.2 Interface Description

This command switches the RF and save the corresponding value, the query features include pin LGA interface PIN45 status query, LGA interface PIN45 pin determines the state of the state of the hardware switch. Background according to the return value of the order to determine the background screen when in operation, whether to pop-up message.

^ RFSWITCH feature is equivalent to + CFUN function (the two values 0 and 1), based on the values save the corresponding value.

AT^RFSWITCH=0 equivalent to AT+CFUN=0

AT^RFSWITCH=1 equivalent to AT+CFUN=1

6.6.3 Parameter Description

<SW state>:

state of RF software switch, the value for the two values 0,1,

0: The state of RF software switch is set to Off.

1: The state of RF software switch is set to on.

<HW state>:

state of RF hardware switch, the value for the two values 0,1,

0: The state of RF hardware switch is set to Off.

1: The state of RF hardware switch is set to on.

6.6.4 Example

Query the current state of RF switch: (return information for the current state of the hardware switch is open, the software switch is off)

AT command issued

AT^RFSWITCH ?

Feedback results:

^ RFSWITCH: 0,1

OK

6.7 +CSQ – Command for Querying the RSSI

6.7.1 Syntax

Command	Possible Response(s)
+CSQ or +CSQ?	<CR><LF>+CSQ:<rssi>,<ber><CR><LF> <CR><LF>OK<CR><LF>
+CSQ=?	<CR><LF>+CSQ:(supported <rssi> list),(supported <ber> list)<CR><LF> <CR><LF>OK<CR><LF>

6.7.2 Interface Description

The execution command queries the current receive signal strength indicator (RSSI) and bit error rate (BER) values.

The test command queries the current RSSI and BER values.

6.7.3 Parameter Description

<rssi>: Indicates the received signal strength. The values are as follows:

0: The strength is equal to or less than –113 dBm.

1: The strength is equal to –111 dBm.

2...30: The strength is between –109 and –53 dBm.

31: The strength is equal to or greater than –51 dBm.

99: The strength is unknown or cannot be measured.

<ber>: A percentage value. BER query is not supported at present. "99" is returned when the execution command and the test command are executed.

6.8 ^RSSILVL – Command for Reporting the RSSI

6.8.1 Syntax

Command	Possible Response(s)
	<CR><LF>^RSSILVL:<rssi><CR><LF>

6.8.2 Interface Description

When the RSSI change exceeds a threshold, the MT automatically reports the RSSI to the TE.

6.8.3 Parameter Description

<rssi>: Indicates the received signal strength. The values are as follows:

0: no signal

20: one bar

40: two bars

60: three bars

80: four bars

99: five bars

6.9 ^HRSSILVL – Command for Reporting the HDR RSSI

6.9.1 Syntax

Command	Possible Response(s)
	<CR><LF>^HRSSILVL:<rssi><CR><LF>

6.9.2 Interface Description

When the HDR RSSI change exceeds a threshold, the MT automatically reports the RSSI to the TE.

6.9.3 Parameter Description

<rssi>: Indicates the received signal strength. The values are as follows:

0: no signal

20: one bar

40: two bars

60: three bars

80: four bars

99: five bars

6.10 ^RSSIREP – Command for Setting the Reporting of the RSSI

6.10.1 Syntax

Command	Possible Response(s)
^RSSIREP=<value>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^RSSIREP?	<CR><LF>^RSSIREP:<value><CR><LF> <CR><LF>OK<CR><LF>
^RSSIREP=?	<CR><LF>^RSSIREP:(supported <value> list)<CR><LF> <CR><LF>OK<CR><LF>

6.10.2 Interface Description

This command sets whether the signal strength is automatically reported.

6.10.3 Parameter Description

<value>:

0: The signal strength is not reported.

1: The signal strength is reported (default value after startup).

6.11 ^CRSSI – Command for Reporting the RSSI

6.11.1 Syntax

Command	Possible Response(s)
^CRSSI	<CR><LF>^CRSSI:<rssi><CR><LF>OK<CR><LF>
	<CR><LF>^CRSSI:<rssi><CR><LF>

6.11.2 Interface Description

The execution command queries the current receive signal strength indicator (RSSI).

When the RSSI change exceeds a threshold, the MT automatically reports the RSSI to the TE.

6.11.3 Parameter Description

<rssi>: Indicates the received signal strength. The values are as follows:

0: The strength is equal to or less than –113 dBm.

1: The strength is equal to –111 dBm.

2...30: The strength is between –109 and –53 dBm.

31: The strength is equal to or greater than –51 dBm.

99: The strength is unknown or cannot be measured.

6.12 ^HDRRSSI – Command for Reporting the HDR RSSI

6.12.1 Syntax

Command	Possible Response(s)
^HDRRSSI	<CR><LF>^HDRRSSI:<hdrrssi><CR><LF>OK<CR><LF>
	<CR><LF>^HDRRSSI:<hdrrssi><CR><LF>

6.12.2 Interface Description

The execution command queries the current receive signal strength indicator (RSSI).

When the HDR RSSI change exceeds a threshold, the MT automatically reports the HDR RSSI to the TE.

6.12.3 Parameter Description

<hdrrssi>: Indicates the received signal strength. The values are as follows:

0: The strength is equal to or less than –113 dBm.

1: The strength is equal to –111 dBm.

2...30: The strength is between –109 and –53 dBm.

31: The strength is equal to or greater than –51 dBm.

99: The strength is unknown or cannot be measured.

6.13 ^TIME – Command for Querying the System Time on the Network Side

6.13.1 Syntax

Command	Possible Response(s)
^TIME	<CR><LF>^TIME:<yyyy/mm/dd hh:mm:ss><CR><LF>
	<CR><LF>OK<CR><LF>
	In case of an MT-related error:
	<CR><LF>ERROR<CR><LF>

6.13.2 Interface Description

This command reads the current system time from the network. If the system time cannot be obtained, "ERROR" is returned.

6.13.3 Parameter Description

<yyyy>: year

<mm>: month

<dd>: day

<hh>: hour

<mm>: minute

<ss>: second

6.13.4 Example

AT^TIME

^TIME: 2010/07/24 17:35:04

OK

6.14 ^COTKSLACT – Command for Defining a Subscriber

6.14.1 Syntax

Command	Possible Response(s)
^COTKSLACT=<MDN>,<MIN>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^COTKSLACT?	<CR><LF>OK<CR><LF>
^COTKSLACT=?	<CR><LF>OK<CR><LF>

6.14.2 Interface Description

The set command sets the MDN and MIN in the subscription information about a subscriber.

6.14.3 Parameter Description

<MDN>: A string with double quotation marks, consisting of 10 digits (0–9).

<MIN>: A string with double quotation marks, consisting of 10 digits (0–9).

6.15 ^OTAACTED – Command for Querying the OTA Activation Status

6.15.1 Syntax

Command	Possible Response(s)
^OTAACTED?	<CR><LF>^OTAACTED:<value><CR><LF> <CR><LF>OK<CR><LF>

6.15.2 Interface Description

This command queries whether the over-the-air (OTA) interface is activated. The initial value of **<value>** is **0**. If the MT is activated through the OTA interface, the value is **1**.

6.15.3 Parameter Description

<value>: Specifies the OTA status.

0: not activated

1: activated

6.16 ^OTACMSG – Command for Indicating the OTA Update Status

6.16.1 Syntax

Command	Possible Response(s)
	<CR><LF>^OTACMSG:<status><CR><LF>

6.16.2 Interface Description

This command reports the OTA update status.

6.16.3 Parameter Description

<status>: Indicates the OTA update status.

0: initialized

1: Over-the-air service provisioning (OTASP) programming started

2: Service Programming Lock unlocked

3: NAM parameters downloaded

4: MDN downloaded

5: IMSI downloaded

6: Preferred roaming list (PRL) file downloaded

7: OTASP commit successful

8: OTASP programming successful

9: OTASP programming unsuccessful

6.17 ^CURRSID – Command for Query SID of The Current System

6.17.1 Syntax

Command	Possible Response(s)
^CURRSID?	<CR><LF>^CURRSID:<curr_sid>,<curr_nid>,<curr_evo_subnetid><CR><LF><CR><LF>OK<CR><LF>
^CURRSID=?	<CR><LF>OK<CR><LF>

6.17.2 Interface Description

This command used to query the SID/NID of the current system. IF the current system is at EVDO only mode, the command can get the EVDO's sub net ID.

6.17.3 Parameter Description

<curr_sid>: the system's current sid.

Decimal number, 0-32767

<curr_nid>: the system's current sid.

Decimal number, 0-65534

<curr_evdo_subnetid>: the evdo's sub-net ID.

Hex number,0-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

6.17.4 Example

a) If there is a usable 1x system, the command could not return the <curr_evdo_subnetid>:

AT^CURRSID

^CURRSID:14844,4001,0

OK

b) If there is only EVDO system, the command could return like that:

AT^CURRSID

^CURRSID:0,0,8E4FC

OK

c) If there is not exited system, the command could return like that:

AT^CURRSID

^CURRSID:0,0,0

OK

7 Call Control Commands

7.1 D – Command for Originating a Data Service Call

7.1.1 Syntax

Command	Possible Response(s)
D[<dial_string>]	<CR><LF>OK<CR><LF>
	<CR><LF>NO CARRIER<CR><LF>
	<CR><LF>CONNECT <text><CR><LF>
	In case of an MT-related error:
	<CR><LF>ERROR<CR><LF>
	<CR><LF>+CME ERROR:<err><CR><LF>

7.1.2 Interface Description

This command originates a data service call.

In this product, this command supports only data service dial-up.

7.1.3 Parameter Description

<dial_string>: Specifies the called number, consisting of ASCII characters. Allowed characters include only 0–9, *, and #.

7.1.4 Example

ATD#777

CONNECT

7.2 H – Command for Disconnecting the Data Service

7.2.1 Syntax

Command	Possible Response(s)
H[<value>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

7.2.2 Interface Description

This command disconnects the data service connection with a remote subscriber. To use this command on the current port, you must enter **+++** to change the current port from the data mode to the command mode.

📖 **NOTE**

If this command cannot be used, you can interrupt a data connection by changing DTR signals from the ON state to the OFF state. For details, see the **&D** command.

7.2.3 Parameter Description

<value>: An integer. The connection is disconnected and "OK" is returned only when the value is **0**. (The connection cannot be disconnected when the value is not **0**, and the response result is "ERROR".) **ATH** is equivalent to **ATH0**.

7.3 +CDV – Command for Originating a Voice Call

7.3.1 Syntax

Command	Possible Response(s)
+CDV<dial_string>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

7.3.2 Interface Description

This command is used by the TE to originate a voice call to the network through the MT.

7.3.3 Parameter Description

<dial_string>: Specifies the called number, consisting of ASCII characters. Allowed characters include only 0–9, *, #, and +. The + symbol can only be placed at the beginning of a number. The maximum length of a number cannot exceed 65.

7.3.4 Example

AT+CDV13372311111

OK

^ORIG:0,0

7.4 +CHV – Command for Disconnecting a Voice Call

7.4.1 Syntax

Command	Possible Response(s)
+CHV[<value>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

7.4.2 Interface Description

This command disconnects a voice call.

7.4.3 Parameter Description

<value>: An integer. The connection is interrupted and "OK" is returned only when the value is **0**. (The connection cannot be interrupted when the value is not **0**, and the response result is "ERROR".) If there is no voice connection, "OK" is returned.

In case of using the command without **<value>**, **<value>** is set to **0**.

7.5 A – Command for Answering a Call A

7.5.1 Syntax

Command	Possible Response(s)
A	<CR><LF>OK<CR><LF>

7.5.2 Interface Description

When a call is originated to the MT, the TE uses this command to notify the MT to answer the call. If there is an incoming call from the third party at this time, this command can also be used to answer the incoming call. If there is no incoming call, "NO CARRIER" is returned.

7.6 RING – Command for Indicating a Call

7.6.1 Syntax

Command	Possible Response(s)
	RING

7.6.2 Interface Description

When a call is originated to the MT, the MT periodically (T is about 5s) reports the indication to the TE.

7.7 S0 – Command for Setting Automatic Answer

7.7.1 Syntax

Command	Possible Response(s)
S0=<value>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
S0?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

7.7.2 Interface Description

This command sets the automatic answer function. After the automatic answer function is enabled, the MT starts automatic answer when there is a new incoming call.

7.7.3 Parameter Description

<value>:

0: Automatic answer is disabled (default value after startup).

1–255: Automatic answer is enabled. An incoming call will be answered after the number of rings set by **<value>**.

7.8 ^ORIG – Command for Indicating the Origination of a Call

7.8.1 Syntax

Command	Possible Response(s)
	<CR><LF>^ORIG:<call_x>,<call_type><CR><LF>

7.8.2 Interface Description

This command indicates that the MT is originating a call.

7.8.3 Parameter Description

<call_x>: Specifies the call ID, uniquely identifying the call. The value ranges from 1 to 9.

<call_type>: Specifies the call type. The values are as follows:

0: voice call

2: PS domain data call (not supported at present)

3: CDMA SMS call (not supported at present)

7: OTA call (standard OTASP numbers)

8: OTA call (non-standard OTASP numbers)

9: emergency call

7.9 ^CONN – Command for Indicating a Call Connection

7.9.1 Syntax

Command	Possible Response(s)
	<CR><LF>^CONN:<call_x>,<call_type><CR><LF>

7.9.2 Interface Description

If the MT is the caller, when a call request is successfully sent to the network and a response from the network is received, the MT reports the response to the TE even

when the call is not answered If the MT receives an incoming call, the MT reports this indication to the TE when the MT answers the call.

7.9.3 Parameter Description

<call_x>: Specifies the call ID, uniquely identifying the call. The value ranges from 1 to 9.

<call_type>: Specifies the call type. The values are as follows:

0: voice call

2: PS domain data call (not supported at present)

3: CDMA SMS call (not supported at present)

7: OTA call (standard OTASP numbers)

8: OTA call (non-standard OTASP numbers)

9: emergency call

7.10 ^CEND – Command for Indicating the End of a Call

7.10.1 Syntax

Command	Possible Response(s)
	<CR><LF>^CEND:<call_x>,<duration>,<end_status>[,<cc_cause>]<CR><LF>

7.10.2 Interface Description

After a call is terminated, the MT reports this indication to the TE to notify the TE of the call end cause and the call duration.

7.10.3 Parameter Description

<call_x>: Specifies the call ID, uniquely identifying the call. The value ranges from 1 to 9.

<duration>: Specifies the call duration in the unit of second. The time starts from reporting of the **^CONN** command until the call is complete.

<end_status>: Specifies the call end cause. In this product, this parameter is set to **255** permanently.

<cc_cause>: Specifies call control information (not supported at present).

7.11 +CLIP – Command for Setting the Presentation of Caller ID

7.11.1 Syntax

Command	Possible Response(s)
+CLIP[=<n>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CLIP?	<CR><LF>+CLIP:<n><CR><LF> <CR><LF>OK<CR><LF>
+CLIP=?	<CR><LF>+CLIP:(supported <n> list)<CR><LF> <CR><LF>OK<CR><LF>
URC	<CR><LF>+CLIP:<number>,<type>,,,,<CLI validity><CR><LF>

7.11.2 Interface Description

The set command sets whether reporting of the caller ID unsolicited result code (URC) is allowed. If the caller ID URC is allowed to be reported, when there is an incoming call, the caller ID indication is provided following the RING indication and periodically (every five seconds) reported to the TE.

7.11.3 Parameter Description

<n>:

0: Caller ID URC reporting is not allowed (default value after startup).

1: Caller ID URC reporting is allowed.

📖 **NOTE**

In case of using the command without **<n>**, **<n>** is set to **0**.

<number>: Specifies a calling number. It is a string with double quotation marks. Allowed characters include only 0–9, *, #, and +.

<type>: Specifies the number type. "145" indicates an international number, and "129" indicates a national number. For details, see section 15.5 "Phone Number Type."

<CLI validity>:

0: The call line identity (CLI) is valid.

1: The CLI is rejected by the call originator.

2: The CLI is unavailable because of the limitation of the originating network or a network problem.

Three fields are reserved between **<type>** and **<CLI validity>**.

7.11.4 Example

+CLIP:"82882690",129,,,,0

or

+CLIP:"",128,,,,1

or

+CLIP:"",128,,,,2

7.12 +CLCC – Command for Querying the Call Status

7.12.1 Syntax

Command	Possible Response(s)
+CLCC	[<CR><LF>+CLCC:<id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>]<CR><LF>
	[<CR><LF>+CLCC:<id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>]<CR><LF>
	[...]]]
	<CR><LF>OK<CR><LF>
	In case of an MT-related error:
	<CR><LF>+CME ERROR:<err><CR><LF>
+CLCC=?	<CR><LF>OK<CR><LF>

7.12.2 Interface Description

This command queries the number of current calls and the state of each call.

If there are no calls, "OK" is returned when this command is executed.

7.12.3 Parameter Description

<idx>: Specifies the call ID. The value ranges from 1 to 9.

<dir>: Specifies the call direction. The values are as follows:

0: MO

1: MT

<state>: Specifies the call state. The values are as follows:

0: active

1: held (not supported at present)

2: dialing

3: alerting (not supported at present)

4: incoming

5: waiting (not supported at present)

<mode>: Specifies the call type. The values are as follows:

0: voice

1: data

<mpty>: Specifies the multiparty call. The values are as follows:

0: non-multiparty call

1: multiparty call (not supported at present)

<number>: Specifies a call number. It is a string with double quotation marks. Allowed characters include only 0–9, *, #, and +. In addition, the + symbol can only be at the start of the number.

<type>: Specifies the type of a call number. "145" indicates an international number, and "129" indicates a national number. For details, see section 15.5 "Phone Number Type."

7.12.4 Example

AT+CLCC

+CLCC:1,0,0,0,0,"13801000841",129

OK

7.13 ^DTMF – Two-Stage Dialing Command

7.13.1 Syntax

Command	Possible Response(s)
^DTMF=<call_x>,<dtmf_digit>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

7.13.2 Interface Description

This command sends a dual tone multiple frequency (DTMF) key value to the network through signaling in the call status.

7.13.3 Parameter Description

<call_x>: Specifies a call ID. The value ranges from 1 to 9.

<dtmf_digit>: ASCII characters, indicating a DTMF key value. Allowed characters include only 0–9, *, and #. Only one character is allowed each time.

7.13.4 Example

AT+CDV10000

OK

^ORIG:2,0

^CONN:2,0

AT^DTMF=2,1

OK

AT^DTMF=2,#

OK

7.14 ^PPPCFG – Command for Setting the PPP User Name and Password

7.14.1 Syntax

Command	Possible Response(s)
^PPPCFG=<userid>,<password>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^PPPCFG or ^PPPCFG?	<CR><LF>^PPPCFG:<userid>,<password><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

7.14.2 Interface Description

This command sets the Point to Point Protocol (PPP) user name and password before data service dial-up. After the dial-up connection is successful, the client can use the user name and password to establish a PPP connection.

7.14.3 Parameter Description

<userid>: Specifies the PPP authentication user name. It is a string with double quotation marks. The maximum length is 127 characters excluding the double quotation marks.

<password>: Specifies the PPP authentication password. It is a string with double quotation marks. The maximum length is 127 characters excluding the double quotation marks.

7.14.4 Example

AT^PPPCFG="Huawei","Huawei"

OK

7.15 +CTA – Command for Setting operating mode

7.15.1 Syntax

Command	Possible Response(s)
+CTA=<cta>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR:<err><CR><LF>
+CTA?	<CR><LF>+CTA:<n><CR><LF> In case of an MT-related error: <CR><LF>ERROR:<err><CR><LF>
+CTA=?	<CR><LF>+CTA:(supported <n> list)<CR><LF> In case of an MT-related error: <CR><LF>ERROR:<err><CR><LF>

7.15.2 Interface Description

Execution command use to set the time to enter the dormant.

Read command use to read the time to enter the dormant.

Test command use to test the time to enter the dormant.

7.15.3 Parameter Description

<cta>: the time to enter the dormant.

8 SMS Interface Commands

8.1 +CPMS – Command for Setting the Short Message Storage Location

8.1.1 Syntax

Command	Possible Response(s)
+CPMS=<mem1>[,<mem2>[,<mem3>]]	<CR><LF>+CPMS:<used1>,<total1>,<used2>,<total2>,<used3>,<total3> <CR><LF> <CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
+CPMS?	<CR><LF>+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3><CR><LF> <CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
+CPMS=?	<CR><LF>+CPMS:(supported <mem1> list),(supported <mem2> list),(supported <mem3> list)<CR><LF> <CR><LF>OK<CR><LF>

8.1.2 Interface Description

The set command sets the short message storage medium corresponding to the short message operations (such as read or write) and return the current usage of the selected medium.

The name and usage of the currently selected storage medium are returned when the read command is executed.

All storage medium types supported by the MT can be returned when the test command is executed.

8.1.3 Parameter Description

<mem1>: Specifies the medium for short message read and deletion. It is a string with double quotation marks. The optional values are as follows:

"SM": R-UIM card

"ME": nonvolatile memory on the module (default value after startup)

<mem2>: Specifies the medium for short message write and sending. It is a string with double quotation marks. Its optional values and default value are the same as those of **<mem1>**.

<mem3>: Specifies the medium for storing the received short message. It is a string with double quotation marks. Its optional values and default value are the same as those of **<mem1>**.

<total1>: An integer, specifying the total number of short messages that can be saved in **<mem1>**.

<total2>: An integer, specifying the total number of short messages that can be saved in **<mem2>**.

<total3>: An integer, specifying the total number of short messages that can be saved in **<mem3>**.

<used1>: An integer, specifying the number of short messages that are saved in **<mem1>**.

<used2>: An integer, specifying the number of short messages that are saved in **<mem2>**

<used3>: An integer, specifying the number of short messages that are saved in **<mem3>**.

8.2 +CNMI – Command for Setting the Mode of New Short Message Notification

8.2.1 Syntax

Command	Possible Response(s)
+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	<CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
+CNMI?	<CR><LF>+CNMI:<mode>,<mt>,<bm>,<ds>,<bfr><CR><LF> <CR><LF>OK<CR><LF>

Command	Possible Response(s)
+CNMI=?	<CR><LF>+CNMI:(supported <mode> list),(supported <mt> list),(supported <bm> list),(supported <ds> list),(supported <bfr> list) <CR><LF> <CR><LF>OK<CR><LF>

8.2.2 Interface Description

The set command sets the mode of notifying the TE of a new short message. Where:

<mode> and **<bfr>** are used to set the mode of notifying the TE of a new short message.

<mt> sets the storage and notification rules for newly received short messages: a new short message is directly reported to the TE; or a new short message is stored in the MT and the storage position is reported to the TE.

<ds> sets whether a short message status report (+CDSI, ^HCDS) is sent.

The supported parameter value is returned when the test command is executed.

8.2.3 Parameter Description

<mode>: Specifies the short message notification mode.

0: The short message notification is stored in the buffer of the MT. If the buffer of the MT is full, the new notification overwrites the oldest notification.

1: The short message notification is sent to the TE. If the short message notification fails to be sent (for example, in online data mode), the notification is discarded (default value after startup).

2: Send a message notification and message status report to the TE. If the sending fails (for example, in the online data mode), buffer the message notification in the MS and send it to the TE later.

In CDMA mode, <mode> always set to 1.

<mt>: Specifies the storage and notification rules for received short messages.

The storage and notification for a new short message has the two modes:

1. The short message is stored in the MT, and a storage position notification is sent to the TE (default value after startup).

The short message notification uses the **+CMTI** command, that is, a new short message is stored in **<mem3>** specified by the **+CPMS** command; the storage location and the index value are reported to the TE.

2. The short message is not stored in the MT but is directly sent to the TE.

The short message notification uses the **^HCMT** command. A new short message is not stored on the board. It is reported to the TE. The TE needs to call the **AT+CNMA** command to acknowledge the reported short message. If the **AT+CNMA** command is not received within two seconds, the MT sends a receiving error to the network.

Figure 8-1 shows the interaction between the TE and the MT in the preceding two modes.

Figure 8-1 Interaction between the TE and the MT
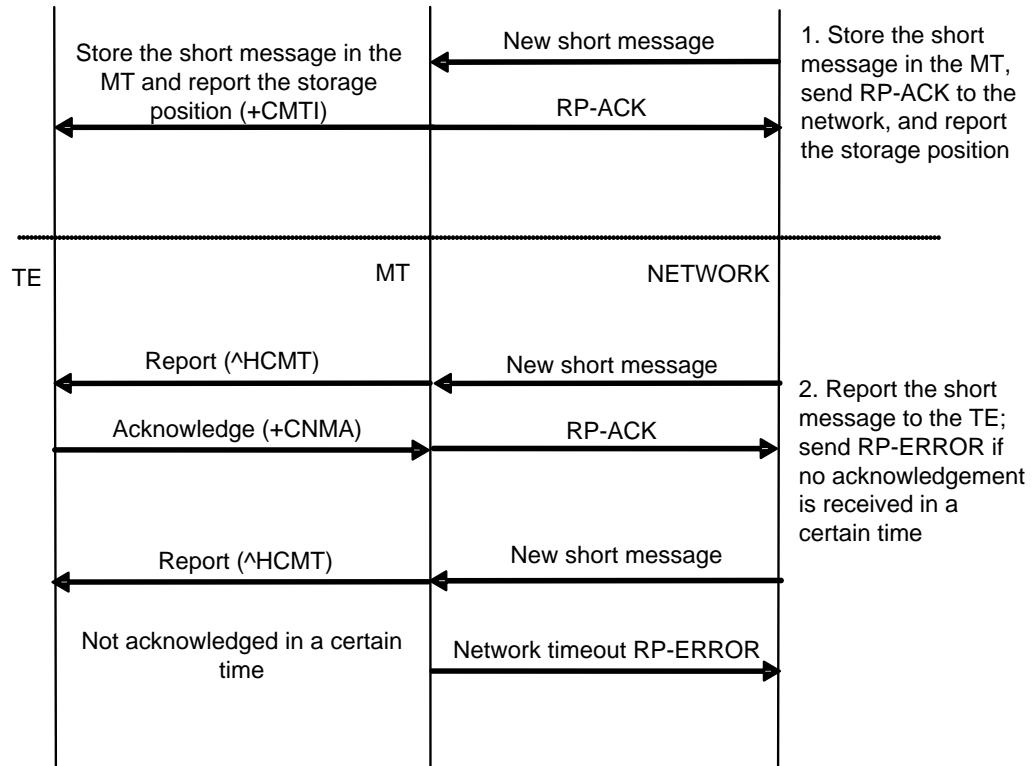
Table 8-1 describes the combinations of the preceding two parameters.

Table 8-1 Combinations of the preceding two parameters

<mode>	<mt>	Saving a Short Message or Not	Reporting a Short Message or Not	Reporting Command
0	1	Yes	No	
1	1	Yes	Yes	+CMTI
0	2	No	No	
1	2	No	Yes	^HCMT

<bm>: Not supported at present. The value is always **0**.

<ds>: Used to set a short message return receipt.

0: A short message return receipt is not sent to the TE.

1: The short message return receipt is not stored in the MT but is sent to the TE.

If PDU mode enabled:

^HCDS: [<reserved>],<length><CR><LF> <layer3 packet><CR><LF>

If Text mode enabled:

^HCDS:
<callerID>,<year>,<month>,<day>,<hour>,<minute>,<second>,<lang>,<format>,<length>,<prt>,<prv>,<type>,<tag><CR><LF><msg><ctrl-z><CR><LF>

2: The short message return receipt is stored in the MT, and a storage position notification is sent to the TE by using the **+CDSI** command. (default value after startup).

+CDSI：<mem>,<index><CR><LF>

<bfr>: Set the buffer processing when <mode>=1, 2 is entered from <mode>=0.

0: In the <mode>1-2 mode, MS sends all URCs to TE in one time. (default value after startup)

1: In the <mode>1-2 mode, clear all URCs..

8.2.4 Example

Set CNMI=1,1,0,1,0.

A new short message is stored in the MT, and the storage position is reported by running the **+CMTI:"ME",1** command. A status report short message is not stored but is reported by using the **^HCDS** command.

If a message notification cannot be reported (for example, in the online-data mode), the message notification is discarded.

8.3 +CMTI – Command for Indicating the Arrival of a Short Message

8.3.1 Syntax

Command	Possible Response(s)
	<CR><LF>+CMTI:<mem>,<index><CR><LF>

8.3.2 Interface Description

This command indicates that a new short message or a new status report short message has been received.

8.3.3 Parameter Description

<mem>: Specifies the storage medium of a short message. Currently, only "SM" and "ME" are supported.

"ME": ME short message storage medium

"SM": R-UIM short message storage medium

<index>: An integer, indicating the position of a short message in the storage medium.

8.4 ^HCMT – Command for Reporting a New Short Message

8.4.1 Syntax

Command	Possible Response(s)
	If PDU mode enabled：
	<CR><LF>^HCMT: [<reserved>],<length><CR><LF> <layer3 packet><CR><LF>
	If text mode enabled：
	<CR><LF>^HCMT:<callerID>,<year>,<month>,<day>,<hour>,<minute>,<second>,<lang>,<format>,<length>,<prt>,<prv>,<type>,<tag><CR><LF><msg><ctrl-z><CR><LF>

8.4.2 Interface Description

This command reports a new short message without storing it to the TE.

8.4.3 Parameter Description

<callerID>: Specifies the number of the short message sender.

<year, month, day, hour, minute, second>: The year, month, day, hour, minute and second when a short message is received.

<lang>: Specifies the language. The values are as follows:

0: unspecified

1: English

6: Chinese

<format>: Specifies the encoding format of a short message. The values are as follows:

0: GSM 7 bit (not supported at present)

1: ASCII encoding (when the encoding range is not greater than 7F)

2: IA5 (not supported at present)

3: octet (not supported at present)

4: Latin (not supported at present)

5: Latin_Hebrew (not supported at present)

6: UNICODE encoding (when the encoding range is greater than 7F)

<Length>: Specifies the length of a received short message.

<prt>: Specifies the priority of a short message. The values are as follows:

0: normal

1: interactive

2: urgent

3: emergency

<Prv>: Specifies the confidentiality level.

0: normal

1: restricted

2: confidential

3: secret

<type>: Specifies the type of a short message.

0: normal

1: CPT (not supported at present)

2: voice mail (not supported at present)

3: SMS report

4: Flash SMS

<tag>: an integer:0~3

0: WMS_TAG_MT_NOT_READ

1: WMS_TAG_MT_READ

2: WMS_TAG_MO_NOT_SENT

3: WMS_TAG_MO_SENT

<Msg>: The received short message.

<layer3 packet>: see ^HCMGS command.

8.5 +CDSI－Command for Indicating the Arrival of a Status Report Short Message

8.5.1 Syntax

Command	Possible Response(s)
	<CR><LF>+CDSI:<mem>,<index><CR><LF>

8.5.2 Interface Description

This command indicates that a new status report short message is received and provides the storage position.

8.5.3 Parameter Description

<mem>: Specifies the storage location of a short message.

"SM": R-UIM short message storage medium

"ME": ROMSIM short message storage medium

<index>: An integer, identifying the position in the storage location.

8.6 ^HCDS – Command for Reporting a New Status Report Short Message

8.6.1 Syntax

Command	Possible Response(s)
	If PDU mode enabled： <CR><LF>^HCDS: [<reserved>],<length><CR><LF> <layer3 packet><CR><LF> If text mode enabled： <CR><LF>^HCDS: <callerID>,<year>,<month>,<day>,<hour>,<minute>,<second>, <lang>,<format>,<length>,<prt>,<prv>,<type>,<tag><CR><LF> <msg><ctrl-z><CR><LF>

8.6.2 Interface Description

This command reports a received new short message report without storing it to the TE.

8.6.3 Parameter Description

<callerID>: Specifies the number of the short message sender.

<format>: Specifies the encoding format of a short message. The values are as follows:

0: GSM 7 bit (not supported at present)

1: ASCII encoding (when the encoding range is not greater than 7F)

2: IA5 (not supported at present)

3: octet (not supported at present)

4: Latin (not supported at present)

5: Latin_Hebrew (not supported at present)

6: UNICODE encoding (when the encoding range is greater than 7F)

<year>: The year when a short message is received.

<month>: The month when a short message is received.

<day>: The day when a short message is received.

<hour>: The hour when a short message is received.

<minute>: The minute when a short message is received.

<second>: The second when a short message is received.

<length>: Specifies the length of a received short message.

<lang>: Specifies the language. The values are as follows:

0: unspecified

1: English

6: Chinese

<prt>: Specifies the priority of a short message. The values are as follows:

0: normal

1: interactive

2: urgent

3: emergency

<Prv>: Specifies the confidentiality level.

0: normal

1: restricted

2: confidential

3: secret

<type>: Specifies the type of a short message.

0: normal

1: CPT (not supported at present)

2: voice mail (not supported at present)

3: SMS report

4: Flash SMS

<tag>：an integer:0~3

0: WMS_TAG_MT_NOT_READ

1：WMS_TAG_MT_READ

2：WMS_TAG_MO_NOT_SENT

3：WMS_TAG_MO_SENT

<Msg>: The received short message.

<layer3 packet>：see ^HCMGS command.

8.7 +CNMA - Command for Acknowledging a New Short Message

8.7.1 Syntax

Command	Possible Response(s)
+CNMA	<CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
+CNMA=?	<CR><LF>OK<CR><LF>

8.7.2 Interface Description

This command replies to the **^HCMT** or **^HCDS** indication received by the TE from the MT.

The execution command acknowledges the reception of a new short message sent to the TE. For usage of the command, see the **+CNMI** command.

Before the previous received short message is acknowledged, the MT does not send another **^HCMT** or **^HCDS** command to the TE.

If the MT does not obtain a short message acknowledgement in the specified time (about two seconds) (due to network timeout), it sends "RP-ERROR" to the network.

If this command is executed but no short message needs to be acknowledged, "+CMS ERROR:<err>" is returned.

8.7.3 Parameter Description

8.8 ^HSMSSS – Command for Setting Short Message Parameters

8.8.1 Syntax

Command	Possible Response(s)
^HSMSSS=<ack>,<prt>, <fmt>,<prv>	<CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
^HSMSSS?	<CR><LF>^HSMSSS:<ack>,<prt>,<fmt>,<prv><CR><LF> <CR><LF>OK<CR><LF>
^HSMSSS=?	<CR><LF>^HSMSSS:(supported <ack> list),(supported <prt> list),(supported <fmt> list),(supported <prv> list)<CR><LF> <CR><LF>OK<CR><LF>

8.8.2 Interface Description

The set command sets parameters for sending short messages, including whether to acknowledge, priority, encoding format, and confidentiality.

📖 **NOTE**

This AT command is only effective in text mode.

8.8.3 Parameter Description

<ack>: Specifies whether a short message status report is required. The values are as follows:

0: The short message status report is not required (default value after startup).

1: The short message status report is required.

<prt>: Specifies the priority of a short message. The values are as follows:

0: normal (default value after startup)

1: interactive

2: urgent

3: emergency

<format>: Specifies the encoding format of a short message. The values are as follows:

0: GSM 7 bit (not supported at present)

1: ASCII encoding (when the encoding range is not greater than 7F)

2: IA5 (not supported at present)

3: octet (not supported at present)

4: Latin (not supported at present)

5: Latin_Hebrew (not supported at present)

6: UNICODE encoding (when the encoding range is greater than 7F)

<Prv>: Specifies the confidentiality level. The values are as follows:

0: normal (default value after startup)

1: restricted

2: confidential

3: secret

8.9 ^HCMGS – Command for Sending a Short Message

8.9.1 Syntax

Command	Possible Response(s)
If PDU mode (+CMGF=0): ^HCMGS=<length><CR><Layer3 packet><ctrl-z/ESC> If text mode (+CMGF=1): ^HCMGS=<da>[,<toda>]<CR> text is entered<ctrl-z/ESC>	If PDU mode (+CMGF=0): <CR><LF>^HCMGS: <mr><CR><LF> <CR><LF>OK<CR><LF> If TEXT mode (+CMGF=1): <CR><LF>^HCMGSS: <mr><CR><LF> <CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
^HCMGS=?	<CR><LF>OK<CR><LF>

8.9.2 Interface Description

This command sends a short message to the network. The short message is sent in two steps:

PDU mode:

Firstly, **^HCMGS=<length>** end with (CR),

TE wait for **<CR><LF><greater_than><space>(IRA 13, 10, 62, 32)** from the MT，
and input the message content that end with<ctrl-Z> (IRA 26).

TEXT mode:

The **^HCMGS=<da>[,<toda>]** command is sent with the end of (CR).

The TE waits **<CR><LF><greater_than><space>(IRA 13, 10, 62, 32)** returned by
the MT, and then sends the message content ending with <ctrl-Z> (IRA 26).

In TEXT mode, it only supports 0~0x00FF with UCS2.

The maximum length of message is 160 characters with 7bit codec, and 70
characters with UCS2S.

8.9.3 **Parameter Description**

<length>: the length is bytes of layer3 packet.

<da>: Specifies the number of the recipient of a short message. It is a string with
double quotation marks, consisting of a maximum of 20 characters. The value can be
0–9, *, #, and +. The "+" symbol can only be at the start of the number.

<toda>: Specifies the address encoding format. It is a digit of one byte. It is not
supported at present. The default value is **0**.

<mr>: A decimal digit, specifying the identifier of a short message. The value ranges
from 0 to 65535.

<ctrl-Z>: Identifies the end of a short message. The character is '0x1A'（'0x001A' in
the Unicode).

<ESC>: Indicates that the sending of a short message is canceled. The character is
'0x1B' ('0x001B' under the Unicode).

<Layer3 packet>：the character is 0～9、A～F，two characters form a Octet.

📖 **NOTE**

Sending of a short message adopts the asynchronous command processing mode in the AT
command. Currently, the asynchronous command processing process cannot process other
AT commands. During the process, if the MT receives a short message-related command,
such as the **+CPMS**, **^HCMGR**, **+CMGD**, **^HCMGL**, **+CNMA**, **+CNMI**, or **^HCMGW** command,
it returns "+CMS ERROR:302". That is, the operation is not allowed. If the MT receives the
^HCMGS command, it returns "^HCMGSF: 0". If the MT receives another command unrelated
to a short message, it returns "+CME ERROR:40". That is, the operation is not allowed.

8.10 ^HCMGSS – Command for Reporting Successful Short Message Sending

8.10.1 Syntax

Command	Possible Response(s)
	<CR><LF>^HCMGSS:<mr><CR><LF>

8.10.2 Interface Description

This command notifies the TE of the successful sending of a short message.

> 📖 **NOTE**
>
> This AT command is only effective in text mode.

8.10.3 Parameter Description

<mr>: A decimal digit, specifying the identifier of a short message. The value ranges from 0 to 65535.

8.11 ^HCMGSF – Command for Reporting Short Message Sending Failure

8.11.1 Syntax

Command	Possible Response(s)
	<CR><LF>^HCMGSF:<err code><CR><LF>

8.11.2 Interface Description

This command notifies the TE of the failure in sending a short message.

> 📖 **NOTE**
>
> This AT command is only effective in text mode.

8.11.3 Parameter Description

<err code>: Specifies an error code of short message sending failure.

0:   WMS_ADDRESS_VACANT_S

1: WMS_ADDRESS_TRANSLATION_FAILURE_S

2: WMS_NETWORK_RESOURCE_SHORTAGE_S

3: WMS_NETWORK_FAILURE_S

4: WMS_INVALID_TELESERVICE_ID_S

5: WMS_OTHER_NETWORK_PROBLEM_S

6: WMS_OTHER_NETWORK_PROBLEM_MORE_FIRST_S

31: WMS_OTHER_NETWORK_PROBLEM_MORE_LAST_S

32: WMS_NO_PAGE_RESPONSE_S

33: WMS_DESTINATION_BUSY_S

34: WMS_NO_ACK_S

35: WMS_DESTINATION_RESOURCE_SHORTAGE_S

36: WMS_SMS_DELIVERY_POSTPONED_S

37: WMS_DESTINATION_OUT_OF_SERVICE_S

38: WMS_DESTINATION_NO_LONGER_AT_THIS_ADDRESS_S

39: WMS_OTHER_TERMINAL_PROBLEM_S

40: WMS_OTHER_TERMINAL_PROBLEM_MORE_FIRST_S

47: WMS_OTHER_TERMINAL_PROBLEM_MORE_LAST_S

48: WMS_SMS_DELIVERY_POSTPONED_MORE_FIRST_S

49: WMS_SMS_DELIVERY_POSTPONED_MORE_LAST_S

64: WMS_RADIO_IF_RESOURCE_SHORTAGE_S

65: WMS_RADIO_IF_INCOMPATIBLE_S

66: WMS_OTHER_RADIO_IF_PROBLEM_S

67: WMS_OTHER_RADIO_IF_PROBLEM_MORE_FIRST_S

95: WMS_OTHER_RADIO_IF_PROBLEM_MORE_LAST_S

96: WMS_UNEXPECTED_PARM_SIZE_S

97: WMS_SMS_ORIGINATION_DENIED_S

98: WMS_SMS_TERMINATION_DENIED_S

99: WMS_SUPPL_SERVICE_NOT_SUPPORTED

100: WMS_SMS_NOT_SUPPORTED_S

101: WMS_RESERVED_101_S

102: WMS_MISSING_EXPECTED_PARM_S

103: WMS_MISSING_MANDATORY_PARM_S

104: WMS_UNRECOGNIZED_PARM_VALUE_S

105 WMS_UNEXPECTED_PARM_VALUE_S

106: WMS_USER_DATA_SIZE_ERROR_S

107: WMS_OTHER_GENERAL_PROBLEMS_S

108: WMS_OTHER_GENERAL_PROBLEMS_MORE_FIRST_S

109: WMS_OTHER_GENERAL_PROBLEMS_MORE_LAST_S

8.12 ^HCMGW – Command for Storing a Short Message

8.12.1 Syntax

Command	Possible Response(s)
If PDU mode enabled： ^HCMGW=<length>,<tag><CR><Layer3 packet><ctrl-z/ESC> If TEXT mode enabled： ^HCMGW=<oa/da>[,<tooa/toda>],<stat>,<ptr>,<type>,<format>,<lang>[,<year, <month>,<day>,<hour>,<minute>, <second>]<CR><text><ctrl-Z/ESC>	<CR><LF>^HCMGW:<index><CR><LF> > <CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
^HCMGW=?	<CR><LF>OK<CR><LF>

8.12.2 Interface Description

This command stores a short message to the storage location specified by **<mem2>** in the **+CPMS** command. The short message can be saved to the "SM" or "ME".

PDU mode:

Save a message to memory, there are two steps:

Firstly, ^HCMGW=<length>,<tag> end with(CR)

TE wait for <CR><LF>< greater_than ><space>(IRA 13, 10, 62, 32) from the MT，and input the message content that end with<ctrl-Z> (IRA 26).

TEXT mode:

Save a message to memory, there are two steps:

Firstly, ^HCMGW=<oa/da>[,<tooa/toda>],<stat>,<ptr>,<type>,<format>,<lang>

[,<year>,<month>,<day>,<hour>,<minute>,<second>] end with(CR)

TE wait for <CR><LF>< greater_than ><space>(IRA 13, 10, 62, 32) from the MT，and input the text content that end with<ctrl-Z> (IRA 26)

8.12.3 Parameter Description

<oa/da>: Specifies the number of the sender or recipient of a short message. It is a string with double quotation marks, consisting of a maximum of 20 characters. The value can be 0–9, *, #, and +. The + symbol can only be placed at the beginning of a number.

<tooa/toda>: Specifies the address encoding format. It is a digit of one byte. It is not supported at present. The default value is **0**.

<stat>: Specifies the storage status of a short message. The values are as follows:

0: received unread short messages

1: received read short messages

2: stored unsent short messages

3: stored sent short message

<lang>: Specifies the language. The values are as follows:

0: unspecified

1: English

6: Chinese

<ptr>: An integer, specifying the priority of a short message. The values are as follows:

0: normal

1: interactive

2: urgent

3: emergency

<year>,<month>,<day>,<hour>,<minute>,<second>: The year, month, day, hour, minute, and second of a short message.

<index>: A number consisting of decimal digits (0–9), specifying the position number in the storage medium. The value ranges from 0 to the value of the maximum memory capacity minus one.

<format>: Specifies the encoding format of a short message. The values are as follows:

0: GSM 7 bit (not supported at present)

1: ASCII encoding (when the encoding range is not greater than 7F)

2: IA5 (not supported at present)

3: octet (not supported at present)

4: Latin (not supported at present)

5: Latin_Hebrew (not supported at present)

6: UNICODE encoding (when the encoding range is greater than 7F)

<type>: Specifies the type of a short message. The values are as follows:

0: normal

1: CPT (not supported at present)

2: voice mail (not supported at present)

3: SMS report

<text>: Specifies the content of a short message.

<CR>: Command termination character, indicating the end of a command.

<ctrl-Z>: Indicates the end of the content of a short message. The character is '0x1A' when the encoding format is not UNICODE encoding; the character is '0x001A' when the encoding format is UNICODE encoding.

<ESC>: Indicates canceling sending of the short message. The character is '0x1B'.

<length>：the length of the bytes of layer3 packet

<Layer3 packet>：the character is 0～9、A～F，two characters form a Octet

<tag>：an integer: 0~3

0：WMS_TAG_MT_NOT_READ

1：WMS_TAG_MT_READ

2：WMS_TAG_MO_NOT_SENT

3：WMS_TAG_MO_SENT

8.12.4 Example

It saves a message but don't send out:

At ^ HCMGW=44,2

>0000021002040702C4CC484898580601FC08190003200010010A104F88307C61F106 C4100306080731164709<ctrl-Z>

^HCMGW:1

OK

8.13 ^HCMGL – Short Message List Command

8.13.1 Syntax

Command	Possible Response(s)
^HCMGL[=<stat>]	if pdu mode (+CMGF=0), command successful. <CR><LF>^HCMGL：<index1>, <tag1>,[<reserved>],<length><CR><LF>< Layer3 packet ><CR><LF> <CR><LF>^HCMGL：<index2>, <tag2>,<reserved>],<length><CR><LF>< Layer3 packet ><CR><LF> …… <CR><LF>OK<CR><LF> if text mode (+CMGF=1), command successful. <CR><LF>^HCMGL：<index1>,<tag1><CR><LF> <CR><LF>^HCMGL：<index2>,<tag2><CR><LF> …… <CR><LF>OK<CR><LF> Else： <CR><LF>+CMS ERROR:<err><CR><LF>
^HCMGL=?	<CR><LF>^HCMGL:(supported <stat> list)<CR><LF> <CR><LF>OK<CR><LF>

8.13.2 Interface Description

The execution command returns all short message indexes with the status value of **<stat>** from the storage medium specified by **<mem1>**.

Status report short messages are considered as received common short messages.

All supported stat values are returned when the test command is executed.

8.13.3 Parameter Description

<stat>: Specifies the type of a short message. The values are as follows:

0: received unread short messages

1: received read short messages

2: stored unsent short messages

3: stored sent short messages

4: all short messages

📖 **NOTE**

In case of using the command without <stat>, <stat> is set to 0.

<index>: An integer, identifying the position in the storage medium.

<tag>: an integer:0~3

0: WMS_TAG_MT_NOT_READ

1: WMS_TAG_MT_READ

2: WMS_TAG_MO_NOT_SENT

3: WMS_TAG_MO_SENT

<length>：the length of the bytes of layer3 packet

8.14 ^HCMGR – Command for Reading a Short Message

8.14.1 Syntax

Command	Possible Response(s)
^HCMGR=<index>[,<mode>]	If PDU mode, command successful: <CR><LF>^HCMGR：<stat>,[<reserved>],<length><CR><LF> <layer3 packet><CR><LF> If TEXT mode, command successful: <CR><LF>^HCMGR：<callerID>,<year>,<month>,<day>,<hour>,<minute>,<second>,<lang>,<format>,<length>,<prt>,<prv>,<type><stat><CR><LF><msg><ctrlz><CR><LF> OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
^HCMGR=?	<CR><LF>OK<CR><LF>

8.14.2 Interface Description

The execution command returns short messages with the storage position of **<index>** from the storage medium specified by **<mem1>**. Whether to modify the short message status depends on the value of **<mode>**.

8.14.3 Parameter Description

<index>: An integer, identifying the position in the storage medium.

<mode>: Specifies the change mode of the short message status. The values are as follows:

0: The short message status is changed to read. (Default)

1: The short message status is not changed.

📖 **NOTE**

In case of using the command without **<mode>**, **<mode>** is set to **0**.

<callerID>: Specifies the number of the short message sender.

<format>: Specifies the encoding format of a short message. The values are as follows:

0: GSM 7 bit (not supported at present)

1: ASCII encoding (when the encoding range is not greater than 7F)

2: IA5 (not supported at present)

3: octet (not supported at present)

4: Latin (not supported at present)

5: Latin_Hebrew (not supported at present)

6: UNICODE encoding (when the encoding range is greater than 7F)

<year, month, day, hour, minute,second>: The year, month, day, hour, minute, and second when a short message is received.

<Length>: Specifies the length of a received short message.

<lang>: Specifies the language. The values are as follows:

0: unspecified

1: English

6: Chinese

<prt>: Specifies the priority of a short message. The values are as follows:

0: normal

1: interactive

2: urgent

3: emergency

<Prv>: Specifies the confidentiality level. The values are as follows:

0: normal

1: restricted

2: confidential

3: secret

<type>: Specifies the type of a short message. The values are as follows:

0: normal

1: CPT (not supported at present)

2: voice mail (not supported at present)

3: SMS report

<stat>: Specifies the type of a short message. The values are as follows:

0: received unread short messages

1: received read short messages

2: stored unsent short messages

3: stored sent short messages

4: all short messages(only useful in ^HCMGL command)

<Msg>: The received short message.

<ctrl-Z>: Indicates the end of the content of a short message. The character is '0x1A' when the encoding format is not UNICODE encoding; the character is '0x001A' when the encoding format is UNICODE encoding.

8.15 +CMGD – Command for Deleting a Short Message

8.15.1 Syntax

Command	Possible Response(s)
+CMGD=<index> [,<delflag>]	<CR><LF>OK<CR><LF> In case of an SMS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
+CMGD=?	<CR><LF>+CMGD:(supported <index> list)[,(supported <delflag> list)]<CR><LF> <CR><LF>OK<CR><LF>

8.15.2 Interface Description

The execution command deletes the short messages in the **<index>** position of the storage medium specified by **<mem1>**. For the setting and description of **<mem1>**, see the **+CPMS** command. If the second parameter **<delflag>** is provided, and the value is not **0**, the MT ignores **<index>** and performs operations based on **<delflag>**.

The current storage position of short messages and the supported **<delflag>** values are returned when the test command is executed.

8.15.3 Parameter Description

<index>: Identifies the storage position of a short message.

<delflag>:

0: The short messages specified by **<index>** are deleted. The execution result corresponds to the execution result without the parameter.

1: All read short messages on the preferred storage medium are deleted; unread, sent, and unsent short messages are retained.

2: All read and sent short messages on the preferred storage medium are deleted; unread and unsent short messages are retained.

3: All read, sent, and unsent short messages on the preferred storage medium are deleted; unread short messages are retained.

4: All short messages (including unread short messages) on the preferred storage medium are deleted.

8.16 ^SMMEMFULL – Command for Reporting Full of Short Messages on a Storage Medium

8.16.1 Syntax

Command	Possible Response(s)
	<CR><LF>^SMMEMFULL:<mem_type><CR><LF>

8.16.2 Interface Description

If the limit for the short messages stored on the specified storage medium has been reached, this event is automatically reported to the TE by using the **^SMMEMFULL** command when a new message arrives. The user can use the **+CPMS** command to switch to another storage medium for storing the message.

8.16.3 Parameter Description

<mem_type>: A string, specifying the type of the storage medium where short messages are full.

"SM": R-UIM card

"ME": nonvolatile memory on the module

8.17 +CMGF – Command for Set Message Format

8.17.1 Syntax

Command	Possible Response(s)
+CMGF[=<mode>]	<CR><LF>OK<CR><LF>

Command	Possible Response(s)
+CMGF?	<CR><LF>+CMGF:<mode><CR><LF> <CR><LF>OK<CR><LF>
+CMGF=?	<CR><LF>+CMGF:(list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

8.17.2 Interface Description

The SET command is used to set the format of the short message. The format has two modes, and depends on the <mode> parameter. The two modes are: PDU mode and TEXT mode. The TEXT mode is unable to display Chinese. The format of message in PDU mode, refers to ^HCMGS command.

The READ command is used to return the current mode selection.

The TEST command returns the applicable <mode> values.

8.17.3 Parameter Description

<mode>:

0   PDU mode

1   TEXT mode (Default)

If no <mode> is included, it is equivalent to the effect that the <mode> is 1.

9 Phonebook Interface Commands

9.1 +CPBS – Command for Selecting a Phonebook Memory

9.1.1 Syntax

Command	Possible Response(s)
+CPBS=<storage> [,<reserved>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CPBS?	<CR><LF>+CPBS:<storage>,<used>,<total><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
+CPBS=?	<CR><LF>+CPBS:(supported <storage> list)<CR><LF> <CR><LF>OK<CR><LF>

9.1.2 Interface Description

The set command selects a phonebook memory. The initial setting is "SM" after the MT is restarted. Other phonebook-related commands are executed on the phonebook memory selected by this command.

The currently selected phonebook memory, number of used entries, and maximum number of entries are returned when the read command is executed.

The supported phonebook memory type is returned when the test command is executed.

9.1.3 Parameter Description

<storage>: Specifies the type of the phonebook memory.

"SM": R-UIM/UICC phonebook (default value after startup)

"ME": Nonvolatile memory on the module

<reserved>: Reserved.

<used>: An integer, specifying the number of used entries in the currently selected memory.

<total>: An integer, specifying the maximum number of entries in the currently selected memory. When the memory is "SM", the maximum value depends on the R-UIM card. When the memory is "ME", the maximum value is **300**.

9.2 ^CPBR–Command for Reading the Phonebook

9.2.1 Syntax

Command	Possible Response(s)
^CPBR=<index1> [,<index2>]	[<CR><LF>^CPBR:<index1>,<number>,<type>,<text>,<coding>[[...] <CR><LF>^CPBR: <index2>,<number>,<type>,<text>,<coding>]<CR><LF>] <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^CPBR=?	<CR><LF>^CPBR:(supported <index> list),<nlength>,<tlength><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

9.2.2 Interface Description

This command returns the phonebook entries between index1 and index2 in the currently selected phonebook memory. If no phonebook entry is available in all positions between index1 and index2, "+CME ERROR: not found" is returned.

If only **<index1>** is specified, only the phonebook records of index1 are returned.

The position range of the currently selected phonebook memory, and the maximum lengths of **<number>** and **<text>** are returned when the test command is executed.

9.2.3 Parameter Description

<index1>, <index2>, <index>: They specify the position in the phonebook. They are integers.

<number>: A string with double quotation marks, specifying a phone number.

<type>: Specifies the number type. The value ranges from 128 to 255. **145** indicates an international number, and **129** indicates a national number. For details, see section 15.5 "Phone Number Type." When the first character in the read phone number is +, **<type>** is set to **145** automatically.

<text>: A string with double quotation marks, specifying a name. When **<coding>** is set to **1**, it indicates that **<text>** is the hex text of original data.

<coding>: Specifies the encoding format, indicating the character code of the **<text>** field, and the language. The values are as follows:

1: RAW mode (**<text>** is uploaded in the original data format.)

2: ASCII (**<text>** is uploaded in the original keyboard value.)

<nlength>: An integer, specifying the maximum length of a phone number. When the memory is "SM", the maximum value depends on the R-UIM card. When the memory is "ME", the maximum value is **40**.

<tlength>: An integer, specifying the maximum length of a name. When the memory is "SM", the maximum value depends on the R-UIM card. When the memory is "ME", the maximum value is **90**.

9.3 ^CPBW–Command for Writing Entries to the Phonebook

9.3.1 Syntax

Command	Possible Response(s)
^CPBW[=<index>][,<number>[,<type>[,<text>,<coding>]]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^CPBW=?	<CR><LF>^CPBW:(supported <index> list),<nlength>,(supported <type> list),<tlength><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

9.3.2 Interface Description

This command stores phonebook entries in the position specified by the currently selected phonebook memory **<index>**. If **<index>** is omitted, but **<number>** is contained in the parameter, the phonebook entry is stored in the first blank position of the phonebook. If there is no blank position, "+CME ERROR: memory full" is reported.

The position range of the currently selected phonebook memory, maximum length of the **<number>** field, all values of the **<type>** field, and maximum length of the **<text>** field are returned when the test command is executed.

When the phonebook is stored, all entered lengths should be within the maximum length range.

9.3.3 Parameter Description

<index>: An integer, specifying the position in the phonebook.

<number>: A string with double quotation marks, specifying a phone number. (Allowed characters are 0–9, '#', '*', '+', '(', ')', and '-'). The three characters '(', ')', and '–' are ignored by the processing program regardless of their positions. The + symbol can only be in the at the start of the number.

<type>: Specifies the number type. The value ranges from 128 to 255. **145** indicates an international number, and **129** indicates a national number. For details, see section 15.5 "Phone Number Type." If this parameter is omitted, and the first symbol in a phone number is +, the default value is **145**. Otherwise, the default value is **129**.

<text>: A string with double quotation marks, specifying a name (its content does not support **Enter** and quotation marks).

<coding>: Specifies the encoding format, which indicates the character code of the **<text>** field, and the language. The values are as follows:

1: RAW mode (**<text>** is uploaded in the original data format.)

2: ASCII (**<text>** is uploaded in the original keyboard value.) In case of using the command without this parameter, this parameter is set to **2**.

<nlength>: An integer, specifying the maximum length of a phone number. When the memory is "SM", the maximum value depends on the R-UIM card. When the memory is "ME", the maximum value is **40**.

<tlength>: An integer, specifying the maximum length of a name. When the memory is "SM", the maximum value depends on the R-UIM card. When the memory is "ME", the maximum value is **90**.

9.3.4 Example

AT^CPBW = 1,"28780808",129,"80534E4E3A",1

📖 **NOTE**

In the above command string the parameter values mean the following:

- 1 (position of the record in the memory)
- "28780808" (phone number)
- 129 (number type)
- " 80534E4E3A" (name Huawei)
- 1 (name encoding format UCS2)

10 Internet Service Interface Commands

10.1 ^IPINIT–Command for Initializing a TCP/UDP Connection

10.1.1 Syntax

Command	Possible Response(s)
^IPINIT[=<APN>[,<user_name>[,<password>]]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^IPINIT?	If initialization is performed: <CR><LF>^IPINIT:<state>,<ip_address>,<APN>, <pri_dns_address>,<sec_dns_address><CR><LF> <CR><LF>OK<CR><LF> If initialization is not performed: <CR><LF>^IPINIT:0<CR><LF> <CR><LF>OK<CR><LF>
^IPINIT=?	<CR><LF>^IPINIT:(supported <state> list)<CR><LF> <CR><LF>OK<CR><LF>

10.1.2 Interface Description

This command initializes a TCP/UDP connection. After initialization is complete, a local IP address is obtained, enabling the next step to be performed, for example, enabling a TCP connection and transmitting UDP data.

In case of using the command without **<user_name>** and/or **<password>**, the user name and password that have been set by running the **PPPCFG** command are used.

10.1.3 Parameter Description

<APN>: Not used by the product. It does not need to be specified. For details, see "Example."

<user_name>: A string with double quotation marks, consisting of a maximum of 31 characters. It can be omitted.

<password>: A string with double quotation marks, consisting of a maximum of 31 characters. It can be omitted.

<state>: Specifies the initialization completion flag.

0: non-initialized

1: initialized

<ip_address >: A string without double quotation marks, specifying the local IP address.

<pri_dns_address>: A string without double quotation marks, specifying the IP address of the primary DNS server.

<sec_dns_address>: A string without double quotation marks, specifying the IP address of the secondary DNS server.

10.1.4 Example

AT^IPINIT

or

AT^IPINIT=,"card","card"

OK

AT^IPINIT?

^IPINIT:1,10.0.10.87,,129.11.18.8,0.0.0.0

OK

10.2 ^IPOPEN–Command for Establishing a TCP/UDP Connection

10.2.1 Syntax

Command	Possible Response(s)
^IPOPEN=<link_id>, <type>, <dest_ip>,<dest_port>, <local_port>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^IPOPEN?	If a connection is established: <CR><LF>^IPOPEN:<link_id>,<type>,<local_port>[,<dest_ip> [,<dest_port>]] [<CR><LF>^IPOPEN:<link_id>,<type>,<local_port>[,<dest_ip> [,<dest_port>]] [...]]<CR><LF> <CR><LF>OK<CR><LF> If no connection is established: <CR><LF>OK<CR><LF>
^IPOPEN=?	<CR><LF>^IPOPEN:(supported <link_id> list), (supported <local_port> list),(supported <dest_port> list)<CR><LF> <CR><LF>OK<CR><LF>

10.2.2 Interface Description

This command establishes a wireless connection with one or more remote servers to complete data exchange. TCP and UDP modes are supported.

10.2.3 Parameter Description

<link_id>: Specifies the ID of a connection. The value ranges from 1 to 5.

<type>: A string, specifying the connection type. Double quotation marks are used in the execution command. Double quotation marks are not contained in the returned value when the read command is executed. For details, see "Example."

"TCP": A TCP connection is established.

"UDP": A UDP connection is established.

<dest_ip>: A string, specifying the target IP address to be connected to. Double quotation marks are used in the execution command. Double quotation marks are not

contained in the returned value when the read command is executed. For details, see "Example."

<dest_port>: An integer, specifying the port of the peer server to be connected to. The value ranges from 1 to 65535.

<local_port>: An integer, specifying the local sending and receiving port. The value ranges from 1 to 65535.

10.2.4 Example

AT^IPOPEN=1,"TCP","129.11.18.8",10000,9000

OK

AT^IPOPEN=2,"TCP","129.11.18.8",10000,8000

OK

AT^IPOPEN=3,"UDP","129.11.18.8",7000,6000

OK

AT^IPOPEN?

^IPOPEN:1,TCP,9000,129.11.18.8,10000

^IPOPEN:2,TCP,8000,129.11.18.8,10000

^IPOPEN:3,UDP,6000,129.11.18.8,7000

OK

10.3 ^IPLISTEN–Command for Enabling Server Listening

10.3.1 Syntax

Command	Possible Response(s)
^IPLISTEN=<type>, <listen_port>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR:<err><CR><LF>
^IPLISTEN?	<CR><LF>^IPLISTEN:<type>,<listen_port>,<idle_num><CR><LF> <CR><LF>OK<CR><LF>
^IPLISTEN=?	<CR><LF>^IPLISTEN:(supported <type> list),(supported <listen_port> list),(supported <idle_num> list)<CR><LF> <CR><LF>OK<CR><LF>

10.3.2 **Interface Description**

This command enables the server listening function. After a server is started, the server can be connected to a maximum of five clients.

10.3.3 **Parameter Description**

<type>: A string, specifying the connection type. Double quotation marks are used in the execution command. Double quotation marks are not contained in the returned value when the READ and test commands are executed. For details, see "Example."

"TCP": A TCP connection is established.

"UDP": A UDP connection is established.

"NULL": No connection is established. The value is returned only when the read command is executed. The value cannot be returned when the test command is executed. The value cannot be used in the execution command.

<listen_port>: An integer, specifying the local listening port. The value ranges from 1 to 65535.

□ NOTE

If server listening is not enabled, **0** is returned when the query command is executed.

<idle_num>: An integer, specifying the number of currently idle connections. The value ranges from 0 to 5.

10.3.4 **Example**

AT^IPLISTEN?

^IPLISTEN:NULL,0,2

OK

AT^IPLISTEN=?

^IPLISTEN:(TCP,UDP),(1-65535),(0-5)

OK

AT^IPLISTEN="TCP",12000

OK

AT^IPLISTEN?

^IPLISTEN:TCP,12000,2

OK

10.4 ^IPSEND–Command for Transmitting TCP/UDP Data

10.4.1 Syntax

Command	Possible Response(s)
^IPSEND=<link_id>,<data>	<CR><LF>^IPSEND:<link_id><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR:<err><CR><LF>
^IPSEND=?	<CR><LF>OK<CR><LF>

10.4.2 Interface Description

This command transmits subscriber data through an established connection.

10.4.3 Parameter Description

<link_id >: Specifies the ID of an established connection. The value ranges from 1 to 5.

<data>: Specifies subscriber data. A maximum of 1,500 bytes enclosed by double quotation marks can be transmitted.

📖 **NOTE**

Only the subscriber data in the form of visible characters can be transmitted. To transmit invisible characters, they must first be converted into visible ones. In addition, subscriber data cannot contain quotation marks and commas.

10.4.4 Example

AT^IPSEND=3,"ASDF"

^IPSEND:3

OK

10.5 ^IPGETDATA–Command for Querying the TCP/UDP Data Receiving Buffer

10.5.1 Syntax

Command	Possible Response(s)
^IPGETDATA=<index>	<CR><LF>^IPGETDATA: <index>,<link_id>,<data_len><CR><LF><data><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR:<err><CR><LF>
^IPGETDATA?	<CR><LF>^IPGETDATA:<index>,<link_id>,<data_len><CR><LF> <CR><LF>OK<CR><LF>
^IPGETDATA=?	<CR><LF>^IPGETDATA:(supported <index> list)<CR><LF> <CR><LF>OK<CR><LF>

10.5.2 Interface Description

This command queries the data receiving buffer provided for a user. The latest received three data packets are stored in the buffer for the user to query. If there are more than three data packets, the new data packets overwrite the oldest data packets.

10.5.3 Parameter Description

<index >: Specifies the index number of the buffered data. The value ranges from 0 to 2.

<link_id>: Specifies the connection ID recorded in the buffered data. The value ranges from 1 to 5.

<data_len>: An integer, specifying the data length. The value ranges from 0 to 1500.

<data>: A string embraced in double quotation marks, specifying subscriber data. Only visible characters are supported. Quotation marks and commas are not allowed in the subscriber data.

10.5.4 Example

AT^IPGETDATA?

^IPGETDATA:0,2,4

^IPGETDATA:1,2,3

^IPGETDATA:2,3,4

OK

AT^IPGETDATA=0

^IPGETDATA:0,2,4,

1234

OK

AT^IPGETDATA=1

^IPGETDATA:1,2,3,

ADF

OK

10.6 ^IPDATA–Command for Indicating the Arrival of TCP/UDP Data

10.6.1 Syntax

Command	Possible Response(s)
	<CR><LF>^IPDATA:<link_id>,<data_len>,<data><CR><LF> <CR><LF>OK<CR><LF>

10.6.2 Interface Description

This command automatically reports the received data.

10.6.3 Parameter Description

<link_id>: Specifies the ID of an established connection. The value ranges from 1 to 5.

<data_len>: An integer, specifying the data length. The value ranges from 1 to 1500.

<data>: A string without double quotation marks, specifying the newly received data. Only visible characters are supported.

10.6.4 Example

^IPDATA:3,4,asdf

OK

10.7 ^IPCLOSE–Command for Disabling a TCP/UDP Connection

10.7.1 Syntax

Command	Possible Response(s)
^IPCLOSE=<link_id>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR:<err><CR><LF>
^IPCLOSE?	<CR><LF>^IPCLOSE:<link1_state>,<link2_state>,<link3_state>,<link4_state>,<link5_state><CR><LF> <CR><LF>OK<CR><LF>
^IPCLOSE=?	<CR><LF>^IPCLOSE:(supported <link_id> list)<CR><LF> <CR><LF>OK<CR><LF>

10.7.2 Interface Description

This command disables a TCP/UDP connection or disables the TCP/UDP function.

If **<link_id>** is set to **1–5**, it indicates that the corresponding established connection is disconnected. To disconnect a TCP connection, four handshaking operations are needed for both party. UDP connection can be disconnected directly.

If **<link_id>** is set to **6**, it indicates that the server listening function is disabled for the module.

If **<link_id>** is set to **7**, it indicates that the module deregisters from the network, which is similar to dial-up disconnection.

10.7.3 Parameter Description

<link_id>: Specifies the ID of a connection. The value ranges from 1 to 7.

1–5: actual connection ID

6: established connection and the local server

7: disable all connections and PPP

<linkx_state>: Specifies the state of connection x.

0: Connection x is disabled and can be used.

1: Connection x is enabled and is being used.

10.7.4 Example

AT^IPCLOSE?

^IPCLOSE:1,1,0,0,0

OK

AT^IPCLOSE=1

OK

AT^IPCLOSE?

^IPCLOSE:0,1,0,0,0

OK

10.8 ^IPENTRANS–Command for Enabling the Transmission Mode

10.8.1 Syntax

Command	Possible Response(s)
^IPENTRANS=<link_id>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

10.8.2 Interface Description

This command enables the TCP transparent transmission mode. In this mode, there is no length restriction on the subscriber data being transmitted to the remote end through a TCP connection.

After "OK" is returned, a subscriber can continuously enter data and transmit the data to the remote end.

If a subscriber continuously enters **+++**, the transparent transmission mode is disabled.

📖 **NOTE**

A UDP connection does not support this mode.

10.8.3 Parameter Description

<link_id>: Specifies the ID of an established connection. The value ranges from 1 to 5.

10.8.4 Example

AT^IPENTRANS=1

OK

Now, the remote end will receive any characters (excluding consecutive three +) entered by a subscriber.

aat

aaaaaaaat

aaat

11 Audio Commands

11.1 ^SWSPATH -Switch Sound Path

11.1.1 Command Syntax

Command	Possible response(s)
^SWSPATH=<n>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^SWSPATH?	<CR><LF>^SWSPATH:<n><CR><LF> <CR><LF>OK<CR><LF>
^SWSPATH =?	<CR><LF>^ SWSPATH:(list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

11.1.2 Description

This command is used to switch sound path in voice call. Resetting the module will not affect the value. Module updating will reset the value to default value.

11.1.3 Defined Values

<n>:

0   handset (default)

1   speaker

2   PCM

11.2 ^CPCM-Configure PCM audio

Command Syntax

Command	Possible response(s)
^CPCM=<mode>,<format>,<clock>,<frame>,<offset>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^CPCM?	<CR><LF>^CPCM:<mode>, <format>,<clock>,<frame>,<offset><CR><LF><CR><LF> OK<CR><LF>
^CPCM =?	<CR><LF>^CPCM:(list of supported <mode>s), (list of supported <format>s) , (list of supported <clock>s), (list of supported <frame>s), (list of supported <offset>s)<CR><LF><CR><LF>OK<CR><LF>

11.2.1 Description

This command is used to configure the PCM audio before a voice call. Resetting the module will not affect the value. Module updating will reset the value to default value.

11.2.2 Defined Values

<mode>:

0   MASTER_PRIM (default)

1   MASTER_AUX (Reserved, not supported currently)

2   SLAVE (Reserved, not supported currently)

<format>

0   linear (default)

1   u-law

2   a-law (Reserved, not supported currently)

<clock>

0   2.048MHz (default)

1   128KHz (Reserved, not supported currently)

<frame>

0   short frame(default)

1   long frame (Reserved, not supported currently)

<offset>

0   offset cleared(default): the sync launched is aligned to the rising edge of the PCM CLK

1   short sync offset set: the short sync sent to the external world in Primary PCM master mode is launched 1/4 cycle after the rising edge of the PCM CLK

2   long sync offset set: the long sync sent to the external world in Aux PCM master mode is launched 1/4 cycle ahead of the rising edge of PCM CLK (Reserved, not supported currently)

11.3 +CMIC -Tune microphone gain level

11.3.1 Command Syntax

Command	Possible response(s)
+CMIC=<level>	<CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>
+CMIC?	<CR><LF>+CMIC: <level>
	<CR><LF><CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>
+CMIC=?	<CR><LF>+CMIC: (list of supported <level>s) <CR><LF><CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>

11.3.2 Description

This command is used to adjust the microphone gain of the MT.

Test command returns supported values as compound value.

11.3.3 Defined values

<level>: 1~12   integer type value with manufacturer specific range (smallest value represents the lowest gain). Default value is 5. Resetting the module will not affect the value. Firmware updating will reset the value to default value.

11.4 +CLVL -Tune loudspeaker volume level

11.4.1 Command Syntax

Command	Possible response(s)
+CLVL=<level>	<CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>
+CLVL?	<CR><LF>+CLVL: <level><CR><LF><CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>

Command	Possible response(s)
+CLVL=?	<CR><LF>+CLVL: (list of supported <level>s) <CR><LF><CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>

11.4.2 Description

This command is used to select the volume of the internal loudspeaker of the MT.

Test command returns supported values as compound value.

11.4.3 Defined values

<level>: 0~5 integer type value with manufacturer specific range (smallest value represents the lowest sound level). 0 means mute. Default value is 2. Resetting the module will not affect the value. Module updating will reset the value to default value.

11.5 +CMUT -Switch mute status

11.5.1 command syntax

Command	Possible response(s)
+CMUT=<n>	<CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF> <CR><LF>OK<CR><LF>
+CMUT?	<CR><LF>+CMUT: <n><CR><LF> <CR><LF>OK<CR><LF>
	<CR><LF>+CME ERROR: <err><CR><LF>
+CMUT=?	<CR><LF>+CMUT: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

11.5.2 Description

This command is used to enable and disable the uplink voice muting during a voice call.

Test command returns supported values as compound value.

11.5.3 Defined values

<n>:

0   mute off (default)

1   mute on

This value restored to 0 when voice call is ended.

11.6 ^SMUT -Switch speaker mute status

11.6.1 Command syntax

Command	Possible response(s)
^SMUT=<n>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF> <CR><LF>OK<CR><LF>
^SMUT?	<CR><LF>^SMUT: <n><CR><LF> <CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
^SMUT=?	<CR><LF>^SMUT: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

11.6.2 Description

This command is used to enable and disable the downlink voice muting.

Test command returns supported values as compound value.

11.6.3 Defined values

<n>:

0   mute off (default)

1   mute on

Resetting the module will not affect the value. Module updating will reset the value to default value.

12 Wakeup Commands

12.1 ^WAKEUPCFG -Wakeup Function Configuration

12.1.1 Command Syntax

Command	Possible response(s)
^WAKEUPCFG=<n>[, <channel>[,<source>]]	<CR><LF>OK<CR><LF> Errors about MT： <CR><LF>+CME ERROR:<err><CR><LF>
^WAKEUPCFG?	<CR><LF>^WAKEUPCFG: <n>,<channel>,<source><CR><LF><CR><LF>OK<CR><LF>
^WAKEUPCFG=?	<CR><LF>^WAKEUPCFG: (list of supported <n>s),(list of <channel>s),(list of supported <source>s) <CR><LF><CR><LF>OK<CR><LF>

12.1.2 Description

This command is used to configure module's wakeup function by host, including the hardware interfaces supported, and the supported remote-wakeup sources.

12.1.3 Defined Values

<n> The status of wakeup function

0: Turn off the wakeup function；

1 : Turn on the wakeup function (Default)；

<channel> Option of hardware interfaces that support wakeup with length of 1 byte.

The supported hardware interfaces are defined with 8-bit mask. Every single bit represents the status of one kind of hardware interface. '1' represents TURN ON and '0' represents TURN OFF. Details are defined as following table:

Bit [3-7]	Bit[2]	Bit[1]	Bit[0]
Reserved	UART (Not Supported)	USB	WAKUP_OUT Pin
Default Value	3 (Support WAKEUP_OUT Pin+USB)		

1: Support WAKUP_OUT Pin only

2: Support USB only

3: Support WAKUP_OUT pin and USB

<source> Parameter to configure remote wakeup source with length of 2 bytes.

This parameter is defined with 16-bit mask. Every single bit represents a remote wakeup source supported by Module. '1' represents TURN ON and '0' represents TURN OFF. Details are defined as following table"

Bit [4-15]	Bit[3]	Bit[2]	Bit[1]	Bit[0]
Reserved	UR	DATA	SMS	Voice
Default Value	3 (Support Voice+SMS)			

12.1.4 Example

Query the current configuration parameters:

AT^WAKEUPCFG?

The wakeup function status is TURN ON. The hardware interface to wakeup is WAKUP_OUT PIN. The supported remote-wakeup sources are Voice, SMS and DATA.

^WAKEUPCFG: 1,1,7

Set the wakeup function status TURN ON. The hardware interface to wakeup is set to USB. Supported remote-wakeup sources are Voice, SMS, DATA and UR.

AT^WAKEUPCFG=1,2,15

Configuration Succeed:

OK

12.2 ^CURC -Unsolicited report control command

12.2.1 Command Syntax

Command	Possible response(s)
^CURC=<mode>	<CR><LF>OK<CR><LF>
^CURC?	<CR><LF>^CURC:<mode><CR><LF> <CR><LF>OK<CR><LF>
^CURC=?	<CR><LF>^CURC: (list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

12.2.2 Interface Description

The SET command is used to set mode value to open or close unsolicited reports. The unsolicited reports it can control are listed below: ：^MODE, ^SIMST ,^CRSSI, ^HDRSSI, ^RSSILVL,^HRSSILVL. The unsolicited reports are closed if the mode value is set to 0 and the unsolicited reports are open if the mode value is set to 1. The default value of mode is set to 1. So, "^CURC=0" should be executed if all the unsolicited reports need to be closed.

The READ command returns the current mode value.

The TEST command returns the value range it supports.

12.2.3 Defined Values

<mode>:

0   the unsolicited reports closed

1   the unsolicited reports open (default value)

2   （not support now）

13 SAR Commands

13.1 ^BODYSARON–Disable or Enable Body SAR

13.1.1 Syntax

Command	Possible Response(s)
^BODYSARON=<on>	In case of successful execution: <CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>ERROR<CR><LF>
^BODYSARON?	In case of successful execution: <CR><LF>^BODYSARON:<on><CR><LF> <CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>ERROR<CR><LF>
^BODYSARON=?	<CR><LF>^BODYSARON:(0,1)<CR><LF> <CR><LF>OK<CR><LF>

13.1.2 Interface Description

This command is used to enable or disable the BodySAR function. Read command can queries current state for BodySAR function, Test command returns supported value of set command.

13.1.3 Parameter Description

< on>: state of BodySAR function

0: disable Body SAR (default).

1: Enable Body SAR.

13.2 ^BODYSARCDMA –Set the max tx Power Limit of CDMA

13.2.1 Syntax

Command	Possible Response(s)
^BODYSARCDMA=<power>	In case of successful execution: <CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>ERROR<CR><LF>
^BODYSARCDMA?	I In case of successful execution: <CR><LF>^BODYSARCDMA:<power><CR><LF> <CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>ERROR<CR><LF>
^BODYSARCDMA=?	<CR><LF>^BODYSARCDMA:(19,24)<CR><LF> <CR><LF>OK<CR><LF>

13.2.2 Interface Description

This command is used to set the max transmit power limit of CDMA. Read command can queries current value of the max transmit power limit, Test command returns supported value of the max transmit power limit.

13.2.3 Parameter Description

< power>: the max transmit power limit of CDMA

Integer from 19 to 24; default value is 24

13.3 ^THERM–Thermal Protection Activated Usolicited Report

13.3.1 Syntax

Command	Possible Response(s)
	<CR><LF>^THERM:<Status><CR><LF>

13.3.2 Interface Description

This command is used to send an unsolicited report to host when entering/exiting thermal protecting state according temperature. This command is affected by AT command ^CURC(if exists).

13.3.3 Parameter Description

<Status>:   Value that indicates whether thermal protection takes effect. The possible values are defined as below:

0   Indicates that the modem has entered thermal protecting state.

1   Indicates that the modem has exit thermal protecting state.

14 GPS Commands

14.1 ^WPDOM–Command for Setting Operation Mode

14.1.1 Syntax

Command	Possible Response(s)
^WPDOM=<mode>	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>
^WPDOM?	<CR><LF>^WPDOM: <mode><CR><LF> <CR><LF>OK<CR><LF>
^WPDOM=?	<CR><LF>^WPDOM: (list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

14.1.2 Interface Description

This command is used to set the position operation mode. Read command can queries current operation mode, Test command returns supported operation mode. SET command can only be used before position session beginning or after end, can't be used during positioning, or will be error.

14.1.3 Parameter Description

<mode>: operation mode, default value is 0, no storing at power down

- 0: standalone only mode，no network assistance is required, and the MS can be in or out of network coverage.

- 1: network only mode，MS operates in MS-assisted position calculation mode only, MS communications with AGPS server for every position fix, and every fix is calculated by AGPS server. Both PDE/PDM access and network coverage are required for this mode of operation. If this mode failed, it'll switch to Cell-ID mode.

- 2: speed optimal, mobile tries to obtain position fixes in such a way that TTF is minimal, depending upon the fix rate and initial uncertainties, MS decides whether to attempt MS-based fix or MS-assisted fix。In CDMA, MS-based and download ephemeris from AGPS server is preferred, if failed then MS-assisted. In UMTS, it's just MS-based.

- 3: accuracy optimal, mobiles tries to obtain position fixes with best accuracy. In CDMA, MS-Assisted mode and download ephemeris from AGPS server is preferred, MS-based mode uses only if MS-assisted fix fails. In UMTS, it's just MS-assisted.

- 4: data optimal, MS will try to minimize the amount of data exchanged over the network. In CDMA, MS-based and download ephemeris from AGPS server is a preferred mode over MS-assisted mode, and minimum AGPS server/network access is allowed. In UMTS, it's just standalone.

- 5: MS-based only, all position fixes provided to PD client are calculated by MS. If communication with network fails, the session will fallback to standalone.

- 6: gpsOneXTRA, provide enhanced standalone performance。It eliminates the need to demodulate the GPS signal for ephemeris, almanac, iono, UTC, or health.

- 7: Cell-ID, the user position will be fixed by the cell which the MS in.

<err>: error description or error code

Error code	Error Description
4	Operation not supported
276	GPS function disabled
277	Standalone disabled
278	AGPS disabled
279	gpsOneXTRA disabled
280	Cell-ID disabled
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

14.2 ^WPDST – Command for Setting Session Type

14.2.1 Syntax

Command	Possible Response(s)
^WPDST=<type>	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>
^WPDST?	<CR><LF>^WPDST: <type><CR><LF> <CR><LF>OK<CR><LF>
^WPDST=?	<CR><LF>^WPDST: (list of supported <type>s) <CR><LF> <CR><LF>OK<CR><LF>

14.2.2 Interface Description

This command is used to set the position session type. READ command queries current session type. TEST command returns supported session type. SET command can only be used before position session beginning or after end, can't be used during positioning, or will be error.

14.2.3 Parameter Description

<type>: session type, default value is 0, no storing at power down

- 0: single-shot fix, this provides the ability to obtain a one-shot position location according to user-specified QoS. The QoS is set by command ^WPQOS.

- 1: tracking fix, this provides the ability to request continuous position fixes and obtain fixes at the user-specified rate. The rate is set by command ^WPDFR.

- 2: last result, this provide the last position information available at the time of request, no fix action.

- 3: Data download, this allow the MS to download ephemeris/almanac data and coarse position a-priori. The data can be used by the PD module to obtain future fixes with a minimal TTF.（Only available in CDMA, not support in UMTS）

<err>: error description or error code

Error code	Error description
4	Operation not supported
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

14.3 ^WPDFR – Command for Setting Fix Rate

14.3.1 Syntax

Command	Possible Response(s)
^WPDFR=<num>,<time>	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>
^WPDFR?	<CR><LF>^WPDFR:<num>,<time><CR><LF> <CR><LF>OK<CR><LF>
^WPDFR=?	<CR><LF>^WPDFR: (list of supported <num>,<time>s) <CR><LF> <CR><LF>OK<CR><LF>

14.3.2 Interface Description

This command is used to set the fix rate of position session. READ command queries the current fix rate, TEST command returns supported fix rates. SET command can only be used before position session beginning or after end, can't be used during positioning, or will be error.

📖 **NOTE**

this command can only use when the session type is tracking fix.

14.3.3 Parameter Description

<num >: the number of position fixes an application will trigger. The range is 1 to 65535, default value is 65535, no storing at power down

<time>: the valid time between fixes. This value is valid for num fixes >1. The range is 1 to 1800(s), default value is 1, no storing at power down

<err>: error code or error description

Error code	Error description
4	Operation not supported
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

14.4 ^WPQOS – Command for Setting Fix QoS

14.4.1 Syntax

Command	Possible Response(s)
^WPQOS=<performance>, <accuracy>	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>
^WPQOS?	<CR><LF>^WPQOS: <performance>,<accuracy><CR><LF> <CR><LF>OK<CR><LF>
^WPQOS=?	<CR><LF>^WPQOS: (list of supported < performance>s,<accuracy>s) <CR><LF> <CR><LF>OK<CR><LF>

14.4.2 Interface Description

This command is used to set the QoS of fix request, include the performance and the accuracy threshold. READ command queries current QoS, TEST command returns supported QoS range. SET command can only be used before position session beginning or after end, can't be used during positioning, or will be error.

Notes: the command is not supported when operation mode is Cell-ID.

14.4.3 Parameter Description

<performance>: the level of desired performance in the scale of 0 to 255, this value encodes the preferred response quality(in seconds) to be used for the GPS pseudorange measurements. No storing at power down.

● 0: this indicates that no time is to be spent making GPS measurements

● 1 to 255: this indicates the upper bound for GPS search. Note that this does not correspond to overall session time, but only the amount of time spent searching in GPS mode.

<accuracy>: this allows applications to specify(in meters) the accuracy threshold for a GPS fix. The range is 25 to 1000 meters, default value is 50 meters, no storing at power down

<err>: error code or error description

Error code	Error description
4	Operation not supported
281	Invalid parameter
283	PD session is ongoing

Error code	Error description
285	Too many parameters

14.5 ^WPDGP – Command for Starting GPS Position

14.5.1 Syntax

Command	Possible Response(s)
^WPDGP	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>

14.5.2 Interface Description

This command is used to start a GPS position. Each time only support one position, if it has have a GPS session, then this command will returns error.

14.5.3 Parameter Description

<err>: error code or error description

Error code	Error description
4	Operation not supported
276	GPS function disabled
283	PD session is ongoing

14.6 ^WPEND – Command for ending GPS Position

14.6.1 Syntax

Command	Possible Response(s)
^WPEND	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>

14.6.2 Interface Description

This command is used to end GPS position session. If there is no active session, this command will return error.

14.6.3 Parameter Description

<err>: error code or error description

Error code	Error description
4	Operation not supported
276	GPS function disabled
284	PD session is in off status

14.7 ^POSITION－Command for Reporting Position Result

14.7.1 Syntax

Command	Possible Response(s)
	<CR><LF>^POSITION: <long>,<lat>,<alt><CR><LF>

14.7.2 Interface Description

This command reports the position result to user. The report interval is related to fix rate. If the time between fix ≥ 3s, it won't limited the report interval, or it will report the first fix result, then report once after three fixes.

14.7.3 Parameter Description

All the default parameters below are 0

<long>: longitude, in the range from -180 degrees to +180 degrees, referenced to the WGS-84 reference ellipsoid, counting positive angles east of the Greenwich meridian and negative angles west of the Greenwich meridian.

<lat>: latitude, in the range from -90 degrees to +90 degrees, referenced to the WGS-84 reference ellipsoid, counting positive angles north of the equator and negative angles south of the equator.

<alt>：altitude, height of MS above the WGS 84 reference ellipsoid in units of 1 meter, ranging from -500 m to 15883 m, where the field value conveys the height plus 500 m, positive is above the horizontal and negative is under the horizontal. （Because of the bug of GPS system, the altitude is not accurate）

14.7.4 Example

When position success,

^POSITION：113.94026d,22.53206d, 270m

14.8 ^POSEND－Command for Reporting Position End

14.8.1 Syntax

Command	Possible Response(s)
	<CR><LF>^POSEND: <reason><CR><LF>

14.8.2 Interface Description

When position end, it will report this command and tell the user the end reason.

14.8.3 Parameter Description

<reason>：position end reason

0：Session ended due to phone going offline

1：Session ended due to no service

2：Session ended due to no connection with PDE

7：Session ended due to connection failure with PDE

9：User ended the session

12：Session ended due to timeout (i.e., for GPS search)

15：Session ended due to an error in fix

16：Session rejected from PDE

18：Ending session due to E911 call

20：Ending because BS information is stale

21：Session ended due to VX LCS agent authorization failure

22：Session ended due to unknown system error

23：Session ended due to unsupported service

24：Subscription violation

25：The desired fix method failed

28：Network indicated a normal ending of the session

29：No error specified by the network

31：Session ended due to position server not available

32：Network reported an unsupported version of protocol

33：Mapped to corresponding SS-MOLR-error error code

34：MO-LR unexpected error

35：MO-LR Data missing

36：MO-LR facility not supported

37：MO-LR subscription violation

38：MO-LR position method failure

39：MO-LR undefined error

43：Position response Nongood (NG) reception (LIS side system anomaly)

44：Position response NG reception (beyond the LSU maximum session count)

45：Position response NG reception (MS side setting information failure)

46：Session interruption NG reception (LIS side system anomaly)

47：Session interruption NG reception (MS side setting information failure)

48：Abnormal response reception

49：T04 timer timed out

50：T03 timer timed out

51：T02 timer timed out

52：IS-801 timer timed out

53：LR reject reception

54：AA reject reception

55：EPH reject reception

56：ALM reject reception

57：Seed reject reception

58：IS-801 sequence error

59：PPP establish trial failure

60：Network link disconnection after PPP established (MS-initiated)

61：Network link disconnection after PPP established (server-initiated)

62：GPS data request response NG reception (LIS side system anomaly)

63：GPS data request response NG reception (beyond LSU maximum session count)

64：GPS data request response NG reception (MS side setting information)

65：GPS data request interruption NG reception (LIS side system)

66：GPS data request interruption NG reception (MS side setting information)

67：T20 timer timed out

68：T21 timer timed out

901：No fix with download the data

911 ：MSA (MSB auto) – No fix with download the data

14.9 ^WPDIM–Command for Deleting Assisted Data

14.9.1 Syntax

Command	Possible Response(s)
^WPDIM=<mode>	<CR><LF>OK<CR><LF> Error: <CR><LF>+CME ERROR: <err><CR><LF>
^WPDIM=?	<CR><LF>^WPDIM: (list of supported < mode>s) <CR><LF> <CR><LF>OK<CR><LF>

14.9.2 Interface Description

This command is used to delete the assisted data. TEST command returns supported delete types. This command can only be used before position begin or after position end, not support deleting during position.

14.9.3 Parameter Description

<mode>: delete type, default value is 2, no storing at power down

● 0: delete operation related to cold start

● 1: delete operation related to warm start

● 2: delete operation related to hot start

● 3: delete gpsOneXTRA data, if the module is not support XTRA, then not support this parameter

<err>: error code or error description

Error code	Error description
4	Operation not supported

Error code	Error description
279	gpsOneXTRA disabled
281	Invalid parameter
282	Unable to delete data
283	PD session is ongoing
285	Too many parameters

14.10 ^GPSTYPE–Command for Quering GPS Type

14.10.1 Syntax

Command	Possible Response(s)
^GPSTYPE?	<CR><LF>^GPSTYPE: <type><CR><LF> <CR><LF>OK<CR><LF>

14.10.2 Interface Description

This command queries current GPS type.

14.10.3 Parameter Description

<type>: indicates GPS type, integer in bits, 1 indicates supporting，0 indicates not supporting

Bits	Bit4	Bit3	Bit2	Bit1	Bit0
GPS Type	Cell-ID	gpsOneXTRA	User plane	Control plane	Standalones

- bit0：indicates supporting standalone or not

- bit1：indicates supporting control plane or not

- bit2：indicates supporting user plane or not

- bit3：indicates supporting gpsOneXTRA or not

- bit4：indicates supporting Cell-ID or not

<err>: error code or error description

Error code	Error description
4	Operation not supported

14.10.4 Example

If the module support all GPS types:

AT^GPSTYPE?

^GPSTYPE：31

OK

15 Appendix

15.1 CME ERROR List

📖 **NOTE**

For all AT commands, if the default value of the CMEE is **2**, "ERROR" can be reported, or "CME ERROR" can be reported. "CME ERROR" includes certain common errors ad certain specific errors of the AT commands.

Table 15-1 lists CME ERRORs that may be produced by certain interface commands and causes. The numbers in the header row are the **<err>** values of the CME ERROR, and numbers in the body of the table are cause IDs. For the mapping between the **<err>** value of CME ERROR and the string, see Table 15-2 . The causes are described later.

For example, **7** is entered in the column of the **+CPWD=** command row with the **<err>** value of **16**, which indicates that the **+CPWD=** command may produce CME ERROR with the **<err>** value of **16**. The text string is "incorrect password", the cause ID is 7, and the specific cause explanation is "incorrect password".

Table 15-1 CME ERRORs and causes

<err> Value	3©	4	10	12	13	14	16	20	21	22	23	24	26	27	100	65280
+CPWD=							7									
+CPIN=	3			5												
+CPIN?			4		6	1										
+CFUN=		2														
+CIMI=	40				6											
+CGSN											8					
^CPBS=			4			1										

<err> Value	3©	4	10	12	13	14	16	20	21	22	23	24	26	27	100	65280
^CPBR=			4		6	1			10	11					12	
^CPBW=			4		6	1		13	10			14	15	16		
^DTMF=																33

The following lists all common and specific errors.

The error causes are as follows:

1: R-UIM busy

2: operation not supported

3: Check performed in the case of no check request

4: R-UIM not inserted

5: with a PUK check request

6: R-UIM failure

7: incorrect password

8: IMEI obtaining failure from the NV or invalid IMEI

10: incorrect index

11: not found of the corresponding phonebook storage item

12: unknown

13: memory full

14: text string too long

15: too long number

16: invalid character in the number

33: Non-existence of the call corresponding to CALL_X

40: operation not allowed

Command error:

41: AT command processing failure due to occupation of the modem port; All AT commands may encounter the error.

Table 15-2 describes the mapping between the **<err>** value of CME ERROR and the string.

Table 15-2 Mapping between the **<err>** value of CME ERROR and the string

<err> Code	String Text
0	phone failure

<err> Code	String Text
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
9	Invalid pin/puk param
10	R-UIM not inserted
11	R-UIM PIN required
12	R-UIM PUK required
13	R-UIM failure
14	R-UIM busy
15	R-UIM wrong
16	incorrect password
17	R-UIM PIN2 required
18	R-UIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required

<err> Code	String Text
46	corporate personalization PIN required
47	corporate personalization PUK required
100	unknown
103	Illegal MESSAGE
106	Illegal ME
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available
263	unknown class specified
264	unknown network message
65280	call index error
65284	SPN file wrong
65285	SPN file access denied
65286	SPN file not exist
65287	another SPN query operation still not finished

15.2 CMS ERROR List

<err> Values	300	301	302	303	304	305	313	314	320	321	322	340	500
+CNMI			4										
+CMGD	2		4				10		12	13			19
+CNMA			4									18	19
+CPMS			4										
^HCMGS			4		6	6							19
^HCMGW	2		4		6	6	10		12		14		

The following lists the **<err>** value of CMS ERROR that may be returned by all AT commands of CDMA product short messages.

Table 15-3 describes the mapping between the **<err>** value of CMS ERROR and the string.

Table 15-3 Mapping between the **<err>** value of CMS ERROR and the string

<err> Code	String Text
300	ME Failure
301	reserved
302	operation not allowed
303	operation not supported
304	INVALID PDU Param
305	INVALID TXT Param
313	R-UIM Failure
314	R-UIM Busy
320	MEM Failure
321	Invalid index
322	MEM Full
340	CNMA Not Exp
341	Length of SMS text too long
350	unknown err

The causes are as follows:

2: NV error

4: operation not allowed

6: incorrect parameter

10: R-UIM wrong

11: R-UIM busy

12: memory failure

13: invalid index

14: memory full

18: no short message to be acknowledged

19: unknown

15.3 Final Result Codes

Final result code	No.	Description
OK	0	A command is executed, and there is no error.
CONNECT	1	A connection is established.
RING	2	An incoming call is originated.
NO CARRIER	3	A connection is terminated.
ERROR	4	There is a common error.
NO DIALTONE	6	There is no dialing tone.
BUSY	7	The peer is busy.
NO ANSWER	8	Timeout occurs when the connection is complete, and there is no reply.
+CME ERROR: <err>		The error type is specified by **<err>**.
+CMS ERROR: <err>		It is a short message-related error.

📖 NOTE

The final result code is the termination flag of an AT command.

# 15.4 Initial Values of Command Parameters After MT Restart
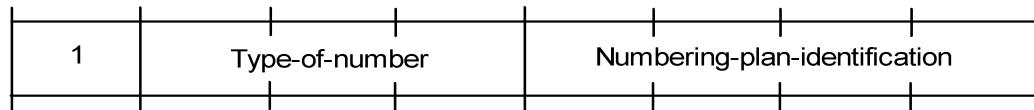
Table 15-4 lists the initial values of the interface parameters mentioned in this document during MT startup.

Table 15-4 Initial parameter values after startup

	Initial Value
E	<value> = 1
V	<value> = 1
S0	<value> = 0
S3	<value> = 013
S4	<value> = 010
S5	<value> = 008
Q	<value> = 0
+CMEE	<value> = 2
+CPMS	<mem1> = ME, <mem2> = ME, and <mem3> = ME
+CNMI	<mode> = 1, <mt> = 1, <bm> = 0, <ds> = 2, and <bfr> = 0
^HSMSSS	<ack> = 0,<prt> = 0,<fmt> = 1,<prv> = 0
+CREG	<n> = 0
&C	<value> = 1
&D	<value> = 2
&S	<value> = 0
+ICF	<format> = 3 and <parity> = 3
+IFC	<DCE_by_DTE> = 0 and <DTE_by_DCE> = 0
+IPR	<rate> = 115200
+CMUT	<n> = 0
^RSSIREP	<value> = 1

15.5 Phone Number Type

The phone number type consists of one byte. Its structure is as follows:

1	Type-of-number	Numbering-plan-identification

Type-of-Number(bit6…bit4): The values are as follows:

0 0 0: This value is selected when the subscriber does not know the check information of the target address number. The address number is organized by the network side.

0 0 1: This value is selected when the subscriber can identity that the number is an international number or the user considers that the number is in the national number range.

0 1 0: The number is a national number without a prefix or a suffix. This value is selected when the subscriber originates a national call.

0 1 1: The number is a specific number on the network and is used for management or service. This value cannot be used by the user.

1 0 1: The number is in the default 7-bit encoding format of the GSM and is not supported at present.

1 1 0: The number is short and is not supported at present.

1 1 1: The number is reserved for extension and is not supported at present.

Numbering-plan-identification(bit3…bit0): The values are as follows:

(Note: bit3…bit0 is valid only when the value of bit6…bit4 is **000,001,010**.

0 0 0 0: The number depends on the number scheme on the network side.

0 0 0 1: ISDN/telephone numbering plan

0 0 1 1: data numbering plan, not supported at present.

0 1 0 0: telex numbering plan, not supported at present.

1 0 0 0: national numbering plan, not supported at present.

1 0 0 1: private numbering plan, not supported at present.

1 0 1 0: ERMES numbering plan, not supported at present.

The common phone number types are as follows:

145: international number

129: national number

161: national number without a prefix or a suffix

15.6 AT Commands That Are Allowed to Be Executed in PIN Code Limit Mode

Command		
E	+CMEE	^RESET
S0	+CFUN	^MSO
S3	+CGMM/+GMM	^CPIN
S4	+CGMI/+GMI	^HWVER
S5	+CGMR/+GMR	^PPPCFG
V	+CGSN/+GSN	^HS
Q	^ICCID	^SYSINFO
&F	+ICF	^RSSIREP
&V	+IPR	^TIME
I	+IFC	^MEID
&C	+CPMS	^OTAACTED
&D	+CPIN	^SWSPATH
&S	+CLVL	^SMUT
A/	+CREG	
	+CHV	

15.7 Acronyms and Abbreviations

Abbreviation	Full Spelling
3GPP	Third Generation Partnership Project
ADC	Analog to Digital Converter
APN	Access Point Name
AT	ATtention
BER	Bit Error Rate
CDMA	Code Division Multiple Access
CLI	Calling Line Identity
CLIP	Call Line Identification Presentation

Abbreviation	Full Spelling
CS	Circuit-switched
CTS	Clear To Send
DCD	Data Carrier Detection
DCE	Data Circuit Equipment
DCS	Data Coding Scheme
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multiple Frequency
DTR	Data Terminal Ready
ESN	Electronic Serial Number
GPIO	General Programmable Input Output Pin
HDR	High Data Rate
ICCID	Integrated Circuit Card Identity
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
IWF	Interworking Function
MCC	Mobile Country Code
MDN	Mobile Directory Number
MEID	Mobile Equipment Identifier
MIN	Mobile Identification Number
MNC	Mobile Network Code
MSIN	Mobile Subscriber Identification Number
MT	Mobile Terminal
NV	Nonvolatile
OTAPA	Over-the-air Parameter Administration
OTASP	Over-the-air Service Provisioning
PCM	Pulse Code Modulation
PIN	Personal Identity Number
PLMN	Public land mobile network

Abbreviation	Full Spelling
PPP	Point to Point Protocol
PRI	Product Release Instruction
PRL	Preferred Roaming List
PS	Packet-switched
PUK	PIN Unblocking Key
R-UIM	Removable User Identify Module
RF	Radio Frequency
RSSI	Receive Signal Strength Indicator
RTS	Request To Send
SCA	Service Center Address
SIM	GSM Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
TA	Terminal Adapter
TE	Terminal Equipment
UIM	User Identity Module
URC	Unsolicited Result Code